

Question Booklet Series: **A**Question Booklet Serial No.: **210429****CET (PG) – 2023****Important:** Please consult your Admit Card/Roll No. slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No.

(In Figure)

(In Words)

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O.M.R. Answer Sheet Serial No.

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Signature of Candidate: _____

Signature of Invigilator: _____

SUBJECT: M.Sc. (Hons./2 Yr. Course) Mathematics

Time: 90 Minutes

Number of Questions: 75

Maximum Marks: 75

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO.**INSTRUCTIONS:**

- Write your Roll No. on the Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
- Enter the Question Booklet Serial No. on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Gel Pen**.
- Do not make any identification mark on the Answer Sheet or Question Booklet.
- Please check that this Question Booklet contains 75 Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
- Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Gel Pen**. There shall be **negative marking** for wrong answer, $\frac{1}{4}$ of the marks of the question will be deducted for every wrong answer.
- If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
- The Entrance Test shall be in **English only**.
- 30 minutes extra should be given to the visually handicapped/PwD Candidates.**
- Darken** the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
- If you want to change an already marked answer, erase the shade in the darkened bubble completely.
- For rough work only the blank sheet at the end of the Question Booklet be used.
- The University will provide Logarithmic table. Borrowing of log table or other material is not allowed.
- The Answer Sheet is designed for computer evaluation. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e. not following the instructions completely, shall be of the candidate only.**
- After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
- In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so would be expelled from the examination.
- A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
- Communication equipment such as mobile phones, pager, wireless set, scanner, pen scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.
- The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. What is the order of the subgroup generated by $25 \pmod{30}$ in the cyclic group $\mathbb{Z}_{30}$ (the integers modulo 30)?
 - (A) 4
 - (B) 5
 - (C) 6
 - (D) 10
2. If A is a 3×3 matrix with real entries, the leading coefficient of the characteristic polynomial of A is
 - (A) 1
 - (B) -1
 - (C) 3
 - (D) -3
3. The total number of automorphisms of the additive group $\mathbb{Z}$ of integers is
 - (A) 1
 - (B) 2
 - (C) 4
 - (D) 8
4. Which of the following statements is false?
 - (A) If S is a linearly dependent subset of a vector space V , then each element of S is a linear combination of others.
 - (B) The vector space $\{0\}$ has dimension 0.
 - (C) The vector space of all real polynomials is infinite dimensional.
 - (D) Every vector space has a basis
5. Let $\mathbb{R}^2$ be the vector space of 2-tuples over reals $\mathbb{R}$. Suppose $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ is a linear transformation such that $T(1, 0) = (1, 4)$ and $T(1, 1) = (2, 5)$. Then $T(2, 3)$ is
 - (A) $(5, 10)$
 - (B) $(2, 11)$
 - (C) $(-5, 10)$
 - (D) $(5, 11)$

6. Let V be the vector space of all 2×2 matrices over the field $\mathbb{Z}_2$ (the integers modulo 2). The number of elements of V is
- (A) 4
 - (B) 8
 - (C) 16
 - (D) infinite
7. Let V and W be vector spaces over reals and let $T : V \rightarrow W$ be a one to one linear transformation. If S is a basis of V , then which of the following statements is true?
- (A) $T(S)$ is always a basis of W .
 - (B) $T(S)$ is never a basis of W .
 - (C) $T(S)$ is a linearly dependent subset of W .
 - (D) $T(S)$ is a linearly independent subset of W .
8. Which of the following statements are true?
- (A) Any group of order 4 is abelian.
 - (B) Any group of order 6 is abelian.
 - (C) Any group of order 8 is abelian.
 - (D) Any group of order 10 is abelian
9. Pick out the true statements:
- (A) The set $\left\{ \begin{bmatrix} a & a \\ a & a \end{bmatrix} \mid a \in R, a \neq 0 \right\}$ is a group with respect to matrix multiplication.
 - (B) The set $\left\{ \begin{bmatrix} a & b \\ c & d \end{bmatrix} \mid a, b, c, d \in R \right\}$ is a commutative ring with identity with respect to matrix addition and matrix multiplication.
 - (C) The set $\left\{ \begin{bmatrix} a & b \\ -b & a \end{bmatrix} \mid a \in R, a \neq 0 \right\}$ is a ring with respect to matrix addition and matrix multiplication.
 - (D) The set $\left\{ \begin{bmatrix} a & b \\ b & a \end{bmatrix} \mid a, b \in R, a, b \neq 0 \right\}$ is a group with respect to matrix multiplication
10. Let θ be a homomorphism from a group G_1 to a group G_2 . If $a \in G_1$, then which of the following is false?
- (A) the order of $\theta(a)$ divides the order of a
 - (B) the order of $\theta(a)$ divides the order of G_1
 - (C) the order of $\theta(a)$ divides the order of G_2
 - (D) none of the above statements is true

11. Let S_n be the symmetric group on n symbols and let $\alpha \in S_n$ be a cycle of odd length. Which of the following statements is true?
- (A) α is a product of even number of odd permutation.
 - (B) α is an odd permutation.
 - (C) α is a product of odd number of odd permutations.
 - (D) none of the above is true
12. let R be a ring with unity. Let 0 be the additive identity of R and 1 the unity of R . Let $I \neq R$ be an ideal of R . Which of the following statements is false?
- (A) 1 always belongs to I
 - (B) 1 never belongs to I
 - (C) 0 always belongs to I
 - (D) 0 belongs to I but 1 does not
13. Which of the following statements is false?
- (A) a ring that is cyclic under addition is commutative.
 - (B) there is a ring with any given number of elements.
 - (C) the centre of a ring is an ideal of R .
 - (D) there is a non commutative ring with infinitely many elements
14. Given that the polynomial $x^3 - 11x^2 + ax - 36$ has a positive root which is the product of the other two roots. The value of a is .
- (A) 6
 - (B) -6
 - (C) 36
 - (D) -36
15. Upto isomorphism, how many abelian groups of order 6 are there?
- (A) 1
 - (B) 2
 - (C) 6
 - (D) 0
16. The smallest positive integer with exactly 20 divisors (including 1 and itself) is
- (A) 120
 - (B) 336
 - (C) 360
 - (D) none of the above

17. Let $f(x)$ be a real polynomial of degree 5. Which of the statements is true?
- (A) all roots of $f(x)$ are real
 - (B) all roots of $f(x)$ are non-real.
 - (C) there is atleast one real root of $f(x)$
 - (D) there is atleast one non-real root of $f(x)$
18. How many numbers are there between 99 and 1000, having exactly one of their digits 7?
- (A) 25
 - (B) 225
 - (C) 250
 - (D) 252
19. Let $f(x) = x^5 - x^4 + 3x^3 + 9x^2 - x + 5$. Which of the following statements is true?
- (A) $f(x)$ has 4 positive real roots
 - (B) $f(x)$ has one negative real root
 - (C) $f(x)$ has two negative real roots
 - (D) all the roots of $f(x)$ are positive
20. Find the number of permutations of the letters of the word ALLAHABAD
- (A) 765
 - (B) 6750
 - (C) 7650
 - (D) 7560
21. The function $f : [0, 1] \rightarrow [0, 1]$ defined by

$$f(x) = \begin{cases} x, & x \text{ rational} \\ 1-x, & x \text{ irrational} \end{cases}$$

is

- (A) continuous at $x = 1$
- (B) continuous at $x = 0$
- (C) continuous at $x = \frac{1}{2}$
- (D) continuous on $[0, 1]$

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22. If P is a polynomial of odd degree and g is a continuous bounded function on $\mathbb{R}$, then $g - P$ is
- (A) > 0
 - (B) < 0
 - (C) has atleast one real zero
 - (D) has exactly one real zero
23. The least upper bound of the set $S = \{(-1)^n + \frac{1}{n}, n = 1, 2, 3, \dots\}$ is
- (A) $\frac{3}{2}$
 - (B) 0
 - (C) 2
 - (D) does not exist
24. If $x + \frac{1}{x} = 2 \cos \theta$ then $x^n + \frac{1}{x^n}$ is
- (A) $2i \cos n\theta$
 - (B) $2i \sin n\theta$
 - (C) $2 \sin n\theta$
 - (D) $2 \cos n\theta$
25. If $\lim_{x \rightarrow 0} f(x) = 0 = \lim_{x \rightarrow 0} g(x)$. Then $\lim_{x \rightarrow 0} \frac{f(x)}{g(x)}$
- (A) always exist
 - (B) may or may not exist
 - (C) does not exist
 - (D) exists and equals zero
26. The series $\sum_{n=1}^{\infty} \frac{n}{n+1}$
- (A) is convergent
 - (B) is divergent
 - (C) converges to zero
 - (D) converges to 1
27. If $f : (a, b] \rightarrow \mathbb{R}$ is continuous, then
- (A) f is bounded
 - (B) f is uniformly continuous
 - (C) f is uniformly continuous if $f(a^+)$ exists
 - (D) f is differentiable

28. If $f(x, y) = 2x^4 - 3x^2y + y^2$, then

- (A) $(0, 0)$ is a point of maxima
- (B) $(0, 0)$ is a point of minima
- (C) $(0, 0)$ is a saddle point
- (D) $f_{xx}f_{yy} - (f_{xy})^2 = 0$ at $(0, 0)$

29. If

$$f(x) = \begin{cases} \frac{1}{2^n}, & \frac{1}{2^{n+1}} < x \leq \frac{1}{2^n}; \quad n = 0, 1, 2, \dots \\ 0, & x = 0 \end{cases}$$

then

- (A) f is Riemann integrable
- (B) f is continuous
- (C) f is differentiable
- (D) f has finitely many discontinuities

30. If f is a continuous function on $[a, b]$ and $\int_a^b f(x)dx = 0$, then

- (A) $f = 0$ on $[a, b]$
- (B) $f > 0$ on $[a, b]$
- (C) $f < 0$ on $[a, b]$
- (D) either $f = 0$ or f takes positive as well as negative values on $[a, b]$

31. If $\sum_{n=1}^{\infty} a_n$, $a_n > 0$ is convergent then $\sum_{n=1}^{\infty} \frac{\sqrt{a_n}}{n^p}$ is

- (A) is convergent for all $p \in \mathbb{R}$
- (B) is divergent for all $p \in \mathbb{R}$
- (C) convergent if $p > \frac{1}{2}$
- (D) convergent if $p > 0$

32. The improper integral $\int_a^b \frac{dx}{(x-a)^n}$ converges if

- (A) $n > 1$
- (B) $n < 1$
- (C) $n = 1$
- (D) $n > 0$

33. $\int_0^{\infty} \frac{\sin x}{x} dx$ is

- (A) convergent
- (B) absolutely convergent
- (C) divergent
- (D) uniformly convergent

34. The value of $\int_0^1 \left(\int_0^1 \frac{x-y}{(x+y)^3} dy \right) dx$ is
- (A) 1
(B) 0
(C) $\frac{1}{2}$
(D) $-\frac{1}{2}$
35. The Jacobian of the transformation from cartesian to cylindrical coordinates is
- (A) r
(B) r^2
(C) $\frac{1}{r}$
(D) $\frac{1}{r^2}$
36. The test for uniform convergence of a series of continuous functions is
- (A) Leibnitz test
(B) Abel's test
(C) Dirichlet's test
(D) Weierstrass M-test
37. The interval of convergence of $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ is
- (A) $(-\infty, \infty)$
(B) $[0, \infty)$
(C) $(0, 1)$
(D) $[-1, 1]$
38. $\int_0^{\pi/2} \sin^4 x \cos^5 x \, dx$ equals
- (A) $\frac{2\pi}{510}$
(B) $\frac{3\pi}{510}$
(C) $\frac{3\pi}{512}$
(D) $\frac{4\pi}{512}$
39. The volume of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ is
- (A) πabc
(B) $4\pi abc$
(C) $\frac{4}{3}\pi abc$
(D) $\frac{1}{3}\pi abc$

40. If

$$f(x, y) = \begin{cases} \frac{xy^2}{x^2+y^4}, & \text{if } x \neq 0 \\ 0, & \text{if } x = 0, \end{cases}$$

then the directional derivative of f at $(0, 0)$ in the direction $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ is

- (A) $\frac{1}{2}$
- (B) $\frac{1}{\sqrt{2}}$
- (C) $\frac{1}{2\sqrt{2}}$
- (D) $\frac{1}{3\sqrt{2}}$

41. Forces are called concurrent when their lines of action meet in

- (A) one point
- (B) two points
- (C) plane
- (D) perpendicular planes

42. The forces, which meet at one point, but their lines of action do not lie in a plane, are called

- (A) coplanar non-concurrent forces
- (B) non-coplanar concurrent forces
- (C) non-coplanar non-concurrent forces
- (D) intersecting forces

43. According to principle of moments

- (A) if a system of coplanar forces is in equilibrium, then their algebraic sum is zero
- (B) if a system of coplanar forces is in equilibrium, then the algebraic sum of their moments about any point in their plane is zero
- (C) the algebraic sum of the moments of any two forces about any point is equal to moment of the resultant about the same point
- (D) positive and negative couples can be balanced

44. D' Alembert's principle is used for

- (A) reducing the problem of kinetics to equivalent statics problem
- (B) determining stresses in the truss
- (C) stability of floating bodies
- (D) solving kinematic problems

45. The product of either force of couple with the arm of the couple is called
- (A) resultant couple
 - (B) moment of the forces
 - (C) resulting force
 - (D) moment of the couple
46. The coefficient of friction depends on
- (A) area of contact
 - (B) shape of surfaces
 - (C) strength of surfaces
 - (D) nature of surface
47. If three forces acting in one plane upon a rigid body, keep it in equilibrium, then they must either
- (A) meet in a point
 - (B) be all parallel
 - (C) atleast two of them must meet
 - (D) all the above are correct
48. Which of the following is the locus of a point that moves in such a manner that its distance from a fixed point is equal to its distance from a fixed line multiplied by a constant greater than one
- (A) ellipse
 - (B) hyperbola
 - (C) parabola
 - (D) circle
49. If three forces acting in different planes can be represented by a triangle, these will be in
- (A) non-equilibrium
 - (B) partial equilibrium
 - (C) full equilibrium
 - (D) unpredictable
50. The differential equation derived from $y = Ae^{2x} + Be^{-2x}$ have the order, where A, B are constants
- (A) 3
 - (B) 2
 - (C) 1
 - (D) 4
- (9)

51. Which of the following is not an integrating factor of $xdy - ydx = 0$?
- (A) $\frac{1}{x^2}$
 (B) $\frac{1}{x^2+y^2}$
 (C) $\frac{1}{xy}$
 (D) $\frac{x}{y}$
52. The solution of $p + q = z$ is
- (A) $f(xy, y \log z) = 0$
 (B) $f(x + y, y + \log z) = 0$
 (C) $f(x - y, y - \log z) = 0$
 (D) None of these
53. The solution of $\frac{\partial^2 z}{\partial x^2} = 0$, is
- (A) $z = (1 + x + x^2)f(y)$
 (B) $z = (1 + y + y^2)f(x)$
 (C) $z = f_1(x) + yf_2(x) + y^2f_3(x)$
 (D) $z = f_1(y) + xf_2(y) + x^2f_3(y)$
54. The general integral of $\frac{\partial z}{\partial x} = 3\left(\frac{\partial z}{\partial x}\right)^2$, is
- (A) $z = ax + 3ay + c$
 (B) $z = ax + 3a^2y + c$
 (C) $z = ax^2 + 3ay + c$
 (D) $z = ax^2 + by^2 + c$
55. Solution of $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$, given $u(0, y) = 8e^{-3y}$, is
- (A) $u = e^{-12x+3y}$
 (B) $u = 8e^{-12x-3y}$
 (C) $u = 8e^{12x-3y}$
 (D) $u = -8e^{-12x+3y}$
56. The singular solution of $y = px - 2p^2$ is
- (A) $8y = x^2$
 (B) $x^2 - 4y = 0$
 (C) $x^2 = 2y$
 (D) $x^2 = y$

57. The ordinary differential equation $x \frac{dy}{dx} - y = 2x^2$ with initial conditions $y(0) = 0$, has
- (A) no solution
 - (B) a unique solution
 - (C) two distinct solution
 - (D) an infinity of solutions
58. The singular solution of the differential equation $p^3 + px - y = 0$ is
- (A) $4x^3 + 27y^2 = 0$
 - (B) $27x^3 + 4y^2 = 0$
 - (C) $4x^2 + 27y^2 = 0$
 - (D) $4x^3 + 27y^3 = 0$
59. The eigen values for the boundary value problem $x'' + \lambda x = 0$; $x(0) = 0, x(\pi) + x'(\pi) = 0$ satisfy
- (A) $\lambda + \tan \lambda \pi = 0$
 - (B) $\sqrt{\lambda} - \tan \lambda \pi = 0$
 - (C) $\sqrt{\lambda} + \tan \sqrt{\lambda} \pi = 0$
 - (D) $\lambda - \tan \sqrt{\lambda} \pi = 0$
60. The differential equation $f_{xx} + 2f_{xy} + 4f_{yy} = 0$, is classified as
- (A) elliptic
 - (B) hyperbolic
 - (C) parabolic
 - (D) None of these
61. If two random variables X and Y are uncorrelated, then:
- (A) They must be independent
 - (B) They must have the same mean and variance
 - (C) They may or may not be independent
 - (D) None of the above
62. A batch of 10 items contains 4 defective items. If we draw samples of size 3 without replacement, from the batch of 10, find the probability that a sample contains 2 defective items.
- (A) 0.30
 - (B) 0.25
 - (C) 0.55
 - (D) 0.45

63. It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%. Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email?
- (A) $9/104$
 (B) $7/104$
 (C) $5/52$
 (D) $5/104$
64. What value of $\alpha \in \mathbb{R}$ ensures that the expected value of X^α is finite, when X is a random variable with a probability mass function of $f(x) = \{x(1+x)\}^{-1}$ for $x = 1, 2, 3, \dots$?
- (A) $\alpha < 1/2$
 (B) $\alpha < 1$
 (C) $\alpha > 1$
 (D) $\alpha > 3/4$
65. Suppose X_1, X_2 are independent exponentially distributed random variables with parameters $\theta_i > 0$, i.e., $X_i \sim \exp(\theta_i)$, $i = 1, 2$, then $Z = \min\{X_1, X_2\}$ follows which distribution?
- (A) $Z \sim \exp(\min\{\theta_1, \theta_2\})$
 (B) $Z \sim \exp(\max\{\theta_1, \theta_2\})$
 (C) $Z \sim \exp(\theta_1 + \theta_2)$
 (D) $Z \sim \exp(\theta_1 \times \theta_2)$
66. Which probability distribution of a continuous positive random variable X satisfies the property that for any $s > 0$ and $t > 0$, the conditional probability $\mathbb{P}(X > s+t \mid X > s) = \mathbb{P}(X > t)$ holds true?
- (A) Exponential distribution with parameter $\lambda = 1$
 (B) Normal distribution with mean, $\mu = 1$, and variance, $\sigma^2 = 1$
 (C) Gamma distribution with shape parameter, $\alpha = 1/2$, and scale parameter, $\theta = 2$
 (D) Uniform distribution on the interval $[0, 1]$

67. A random variable X has a normal distribution with mean μ and variance σ^2 . Another random variable Y is defined as $Y = (X - \mu)^2 / \sigma^2$. What is the distribution of Y ?
- (A) Normal distribution with mean σ^2 and variance $2\sigma^4$
 - (B) Chi-square distribution with 1 degree of freedom
 - (C) Exponential distribution with parameter μ^2/σ^2
 - (D) F distribution with 1 degree of freedom in both the numerator and denominator
68. The joint probability density function of two random variables X and Y is $f_{XY}(x, y) = \frac{1}{3}(3x^2 + xy)$, $0 < x < 1$, $0 < y < 2$, then $\mathbb{P}(X + Y \geq 1)$ equals
- (A) $7/72$
 - (B) $65/72$
 - (C) $23/72$
 - (D) $9/72$
69. If X is a Poisson random variable (i.e., $X \sim P(\lambda)$) such that $\mathbb{P}(X = 2) = 9\mathbb{P}(X = 4) + 90\mathbb{P}(X = 6)$, what is the value of λ .
- (A) 1
 - (B) 2
 - (C) $1/2$
 - (D) $2/3$
70. If the bisection method is used to find a root of a function within an interval $[a, b]$, and the number of iterations required for convergence is n , then the error tolerance ϵ is proportional to:
- (A) $1/n$
 - (B) $1/n^2$
 - (C) $1/n^3$
 - (D) $1/2^n$
71. Which statement(s) about Simpson's rule and its level of exactness are true?
- I: Simpson's rule is exact for linear functions.
 - II: Simpson's rule is exact for second-degree polynomials.
 - III: Simpson's rule is exact for third-degree polynomials.
- (A) Only statement I is true
 - (B) Only statement II is true
 - (C) Statements I and II are true
 - (D) Statements I, II, and III are true

72. Convergence of the Newton-Raphson method for $f(x) = 0$ is dependent upon the condition
- (A) $|f'(x) f''(x)| < (f'(x))^2$
 - (B) $|f(x) f'(x)| < (f''(x))^2$
 - (C) $|f(x) f''(x)| < (f'(x))^2$
 - (D) $|f(x) f'''(x)| < (f''(x))^2$
73. Find the limit of the sequence generated by the recursive formula $x_{n+1} = \frac{x_n}{8} \left(6 + \frac{15}{x_n^2} - \frac{x_n^2}{5} \right)$ as n approaches infinity, given that $x_0 = 0.5$ and a is a positive real constant.
- (A) $3^{1/3}$
 - (B) $5^{1/2}$
 - (C) $2^{1/5}$
 - (D) $5^{1/3}$
74. Consider the differential equation $\frac{dy}{dx} = -y, y(0) = 1$. If we use Euler's method with step size $h = 0.1$, what is the approximate value of $y(0.2)$?
- (A) 0.67
 - (B) 0.82
 - (C) 0.90
 - (D) 0.98
75. Consider the quadrature formula: $\int_{-1}^1 f(x) dx = (f(-2) + 22f(0) + f(2))/12$, with step length $h = 1$. What is the degree of exactness of this formula for polynomials?
- (A) Two
 - (B) Three
 - (C) Four
 - (D) None of the above

LL.M.

1. Which Article of the Constitution provides for the special address by the Governor?
(A) Article 175 (B) Article 205 (C) Article 176 (D) Article 178
2. By which Amendment to the Constitution Part IV-A on Fundamental Duties were added?
(A) 42nd (B) 86th (C) 52nd (D) 26th
3. The law declared by the Supreme Court shall be binding on all the courts within the territory of India :
(A) Article 141 (B) Article 145 (C) Article 146 (D) Article 147
4. Secularism is a part of Basic Structure of Constitution of India was held in :
(A) Kesavananda Bharti versus State of Kerala
(B) Kesavananda Bharti versus State of Punjab
(C) Kesavananda Bharti versus State of Madras
(D) Kesavananda Bharti versus State of Andhra Pradesh
5. _____ Article of the Constitution makes mention of the Reservation in Public Employment in favour of the backward classes :
(A) Article 16 (1) (B) Article 16 (2) (C) Article 16 (3) (D) Article 16 (4)
6. Personal bias means :
(A) When the person sits as a Judge and one of the parties is his relative
(B) When he holds the shares in the company which is one of the parties before him
(C) When he wants some share in the property which is the subject matter of the dispute
(D) None of the above
7. A. K. Kraipak Vs Union of India is a landmark Judgment in relation to
(A) Bias; violation of principle of natural justice
(B) Delegated Legislation
(C) Corporations
(D) Rule of Law
8. "Administrative Law is a law concerning the Powers and Procedure of administrative agencies including especially the Law Governing Judicial review of administrative action". This definition is given by :
(A) Ivor Jennings (B) K. C. Davis (C) HWR Wade (D) Cesare Beccaria
9. Which of the following is not the meaning of Rule of Law according to AV Dicey :
(A) Supremacy of law (B) Equality before law
(C) Predominance of legal spirit (D) Wide discretionary powers
10. The Doctrine of separation of power was systematically propounded by
(A) Montesquieu in his book the spirit of laws
(B) Plato in his book the social contract
(C) Aristotle in his book the spirit of laws
(D) Montesquieu in his book the constitution

11. 'Delegatus non protest delgare' means
 - (A) The delegate not protest against the authority
 - (B) The delegate does not have potential for making laws
 - (C) The delegate cannot further delegate
 - (D) The delegate can further delegate
12. Who is the present Chairman of National Human Rights Commission?
 - (A) Justice Navin Sinha
 - (B) Justice S. Abdul Nazeer
 - (C) Justice Arun Kumar Mishra
 - (D) Justice Indira Banerjee
13. Who among the following propounded the modern principle of natural Justice?
 - (A) Locke
 - (B) J S Mill
 - (C) A V Dicey
 - (D) John Rawls
14. Guidelines for arrest of person by the police were given by the Supreme Court in which of the following cases?
 - (A) Meenka Gandhi versus Union of India
 - (B) Auto sankar versus State of Tamil Nadu
 - (C) Hussainara Khatoon versus State of Bihar
 - (D) DK Basu versus State of West Bengal
15. Convention on the elimination of all forms of discrimination against women was adopted in :
 - (A) 1966
 - (B) 1979
 - (C) 1983
 - (D) 1993
16. The doctrine of _____ means that the absolute liability for harm to environment extends not only to compensate the victims of pollution but also to the cost of restoring the environmental degradation
 - (A) Polluter pays principle
 - (B) Precautionary principle
 - (C) Public Trust
 - (D) Public Nuisance
17. In which of the following cases, the Supreme Court directed closing down and demolition of shrimp industries in coastal regulation zone and implement the precautionary principle and the polluter pays principle and held them liable for payment of compensation for reversing the ecology and compensate the individual for loss suffered ?
 - (A) S Jagannath Vs Union of India
 - (B) Vellore Citizens Welfare Forum Vs Union of India
 - (C) M.C Mehta versus Union of India
 - (D) Church of God (full gospels) in India Versus KKR Majestic colony welfare Association
18. Section 25 of the Environment Protection Act, 1986 deals with _____.
 - (A) Government Analysts
 - (B) Power to make rules
 - (C) Bar of Jurisdiction
 - (D) Protection of action taken in good faith
19. Which of the following is popularly known as 'forest conservation case'?
 - (A) Environment Awareness Forum Vs State of Jammu and Kashmir
 - (B) T.N. Godavarman Thirumulpad Vs Union of India

- (C) M C Mehta Vs Union of India
- (D) Tata Engineering and Locomotive Company Limited versus State of Bihar

20. Under CCS [CCA] Rules, 1965 which of the following is not minor penalties :
- (A) Censure
 - (B) Withholding of the promotion
 - (C) Compulsory Retirement
 - (D) Withholding of increments
21. Grave and Sudden provocation is a
- (A) A Question of law
 - (B) A Question of fact
 - (C) A mixed question of law and fact
 - (D) None of these
22. For abduction the abducted person should be
- (A) Below 16 years of age
 - (B) Below 18 years of age
 - (C) Insane person
 - (D) No age mentioned
23. Cheating and thereby dishonestly inducing delivery of property, or the making alteration or destruction of a valuable security is dealt under :
- (A) Section 417 of IPC
 - (B) Section 418 of IPC
 - (C) Section 419 of IPC
 - (D) Section 420 of IPC
24. Under section 120 A of IPC, to constitute the offence of criminal conspiracy at least :
- (A) 2 members are required
 - (B) 3 members are required
 - (C) 4 members are required
 - (D) 5 members are required
25. In which of the following case, it was held that Death Sentence should be granted in "rare of the rarest Cases" :
- (A) R Vs Govinda
 - (B) Hussainara Khatoon Vs State of Bihar
 - (C) Sunil Batra Vs Delhi Administration
 - (D) Bachan Singh versus State of Punjab
26. The leading case state of Bombay Versus Rusy Mistry is related to :
- (A) Arrest
 - (B) Bail
 - (C) FIR
 - (D) Charge
27. Application for plea bargaining may be filed by :
- (A) The Prosecutor
 - (B) The Defacto complainant
 - (C) The Accused
 - (D) The Legal Services Authority Act
28. _____ of Code of Criminal Procedure deals with the power of private person to arrest :
- (A) Section 40
 - (B) Section 44
 - (C) Section 43
 - (D) Section 41
29. Who may record confessional statement under section 164 of Cr.P.c
- (A) Police officer
 - (B) Executive magistrate
 - (C) Civil Judge
 - (D) Any judicial magistrate
30. A court of session may take cognizance of offence under section 199 of the code of criminal procedure 1973 when the offence is
- (A) Cognizable and non bailable
 - (B) The defamation of high dignitaries
 - (C) Non compoundable
 - (D) Punishable with death or life imprisonment

31. Under section 90 of Indian Evidence Act court may presume the genuineness of document when such document is _____ years old
 (A) 20 years (B) 25 years (C) 99 years (D) 30 years
32. The rule of “no one can blow hot and cold in the same breathe” relates to
 (A) Doctrine of lis pendes (B) The doctrine of feeding the grant by estoppel
 (C) The doctrine of holding out (D) The doctrine of election
33. A fact is said to be “Not proved”
 (A) when it is disproved
 (B) when, after considering the matters before it, the court believes that it does not exist
 (C) when a prudent man considers that the fact does not exist
 (D) when it is neither proved nor disproved
34. “The burden of proof in a suit or a proceeding lies on that person who would fail if no evidence at all were given on the either side” this provision is contained in which section of the Indian Evidence Act ?
 (A) Section 101 (B) Section 111 (C) Section 102 (D) Section 113
35. Relevancy and admissibility under the Indian Evidence Act, 1872 are
 (A) Synonymous (B) Co-extensive (C) Not synonymous (D) Not co-extensive
36. There are certain things arranged in a certain order in a certain place
 (A) is a fact (B) is an opinion (C) is a document (D) is a motive
37. The Plea of alibi is governed by
 (A) Section 6 (B) Section 8 (C) Section 11 (D) Section 12
38. In which case, the Supreme Court pointed out that there was nothing wrong in relying on the part of the confessional statement [inculpatory or self incriminating] and rejecting the rest [exculpatory part made in self-defence] ?
 (A) Nishi Kant Jha versus State of Bihar
 (B) Pakala Narayan Swami versus Emperor
 (C) Veera Ibrahim versus State of Maharashtra
 (D) Palvinder Kaur versus State of Punjab
39. A retracted confession
 (A) Can be made solely the basis of conviction
 (B) Can be made used against the person making it if is supported by independent and corroborated evidence
 (C) Cannot be made solely the basis of conviction unless the same is corroborated
 (D) None of the above
40. A confession which is firstly made by accused voluntarily but after some time taken back and denies it is called
 (A) Extra Judicial Confession (B) Judicial confession
 (C) Retracted confession (D) Truncated confession
41. Alienation by Karta without legal necessity or benefit of estate is :
 (A) Valid (B) Voidable at the instance of the coparceners
 (C) Voidable at the instance of the Aliene (D) Void ab initio

42. Which Section of Hindu Marriage Act deals with the custody of the minor Children?
 (A) Section 27 (B) Section 24 (C) Section 26 (D) Section 29
43. Anand karaj is the customary ceremony of marriage prevalent among
 (A) The Buddhist (B) The Sikhs (C) The Christians (D) The Parsis
44. An adoption made by Hindu male without the consent of his wife is
 (A) Valid (B) Voidable (C) Void (D) Not valid
45. Dastane versus Dastane is a landmark case on :
 (A) Cruelty as a ground of divorce (B) Adoption
 (C) Desertion (D) Maintenance
46. Provisions relating to set off and counter claims under CPC are contained in
 (A) Order VI (B) Order VII (C) Order VIII (D) Order IX
47. Which of the following provisions of CPC prohibits further appeal against the decision of single judge in second appeal?
 (A) Section 100 (B) Section 100 A (C) Section 101 (D) Section 102
48. Who can file a suit under section 91 of CPC in case of public nuisance
 (A) Any citizen (B) District Magistrate
 (C) Advocate General (D) Any advocate
49. If the official assignee refuses to defend a suit relating to the insolvent property :
 (A) The insolvent is not entitled to defend the suit independently of the official assignee
 (B) The creditor cannot file an appeal on the official receiver failure to do so in a litigation to which they were not parties
 (C) Either A or B
 (D) None of these
50. Which of the following suit is not of a civil nature
 (A) A suit to declare the election of a candidate as contrary to law
 (B) A right to take out procession
 (C) A right to worship in a temple
 (D) A suit for right to services which are honorary and gratuitous
51. Which of the following model law was used by the Indian Arbitration and Conciliation Act, 1996?
 (A) Constitution of India
 (B) Guidelines of Supreme Court of India
 (C) European commercial arbitration procedure
 (D) UNCITRAL, 1985
52. Which among the following is the main objective of the Arbitration Act, 1996?
 (A) To compare reprehensibly cover international commercial arbitration
 (B) To ensure that arbitral tribunal within the limits of courts jurisdiction
 (C) To minimize the supervisory role of courts in the arbitral process
 (D) None of the above

- 53.** An arbitral award
- (A) has to be in writing but need not be signed
 - (B) has to be in writing and signed by the members of the arbitral tribunal
 - (C) May be oral
 - (D) Either A or B or C
- 54.** An arbitral award shall be enforced in the same manner as if it were a decree of
- (A) Local Authority (B) The court (C) The tribunal (D) Both B & C
- 55.** What is the status of award by Lok Adalat?
- (A) Every award of the Lok Adalat shall be deemed to be a decree of a Civil Code
 - (B) Every award of the Lok Adalat shall not be deemed to be the degree of a civil court
 - (C) Every award of Lok Adalat may be deemed to be decree of a civil court
 - (D) Every word of Lok Adalat may not be deemed to be decree of a civil court
- 56.** Which of the following case provides about the list of cases which can be and cannot referred to ADR process?
- (A) Anita Kushwala versus Pushap Sudan
 - (B) K.N. Govindankutty Menon versus C D Shaji
 - (C) Sheela Barse versus State of Maharashtra
 - (D) Afcons infrastructure Limited v/s Cherian Varkey Construction Co Private Ltd
- 57.** Under section 12 of the specific relief act, 1963, the general rule is that
- (A) The specific performance of a part of the contract can be granted
 - (B) The specific performance of a part of the contract shall not be granted
 - (C) The specific performance of a part of the contract may not be granted
 - (D) A contract can be performed in piecemeal
- 58.** Judgment in a declaratory suit means
- (A) Judgment in rem (B) Judgment in personam
 - (C) Both (A) or (B) (D) None of these
- 59.** Under section 6 of specific relief act, a suit for recovery recovering possession of an immovable property can be filed within
- (A) 30 days of dispossession (B) 60 days of dispossession
 - (C) 6 months of dispossession (D) one year of dispossession
- 60.** Section 20 of the Specific Relief Act deals with
- (A) Contract that cannot be enforced (B) Substituted Performance of contract
 - (C) Minor contract (D) Contingent contract
- 61.** Illegality renders a contract
- (A) Enforceable (B) Punishable
 - (C) Illegal and Void (D) Voidable
- 62.** A agrees with B to discover treasure by magic. The agreement is
- (A) Void (B) Voidable at the option of B
 - (C) Impossible in itself and void (D) Enforceable
- 63.** A contract is not frustrated
- (A) By commercial hardship (B) By destruction of subject matter

- (C) Change of circumstances (D) Death of incapacity of party
64. Hadley and Baxendale is a leading case on
 (A) Anticipatory breach (B) Damages
 (C) Breach of implied term (D) All of the above
65. In case of anticipatory breach of contract, an aggrieved party
 (A) Cannot claim any remedy as performance is still executor
 (B) May wait till the date of performance arrives and sue for damages
 (C) Does not have the right to terminate the contract
 (D) Has the Right to claim performance at anytime
66. Liquidated damages is essentially a
 (A) Payment of money stipulated as a warning to the offending party
 (B) Payment of compensation determined by the court
 (C) Compensation arbitrarily determined by the agreed party
 (D) Genuine covenanted pre-estimate of damages
67. Effect of ratification of an unauthorized act is mentioned in
 (A) Section 195 (B) Section 196 (C) Section 199 (D) Section 201
68. According to Section 31 of partnership Act, a new partner can be introduced or admitted into a firm :
 (A) By unanimous consent of all the partners
 (B) By the consent of majority of the partners
 (C) By consent of all partners but subject to contract between the partners
 (D) By consent of all partners, but subject to contract between partners and to the provisions of section 30
69. Which of the following is not the mode of Dissolution of a firm provided for under sections 40 to 44 of the partnership Act?
 (A) Dissolution by agreement (B) Compulsory Dissolution
 (C) Dissolution by notice (D) Dissolution by minor through a guardian
70. Which of the following is not a leading case on the Doctrine of holding out?
 (A) Snow White Food Products (P) Limited versus Sohan Lal bagla
 (B) Tower Cabinet co. versus Ingram
 (C) Scarf versus Jardine
 (D) Trimble versus Goldberg
71. Section 17 of Sale of Goods Act, 1930 provides for implied conditions in a contract of sale of goods
 (A) by description (B) by sample
 (C) by sample as well as by description (D) either by sample or by description
72. Section 20 of Sale of Goods Act, 1930 provides for contracts relating to
 (A) Specific goods in a deliverable state
 (B) Specific goods to be put into a deliverable state
 (C) Goods in a deliverable state
 (D) Goods to be put into a deliverable state

73. Mark the incorrect option with reference to the various provisions of the Sale of Goods Act, 1930
- (A) Property passes when intended section 19 to pass
 - (B) Specific goods in a deliverable state section 20
 - (C) Risk prima facie passes with property: section 25
 - (D) Specific goods to be input into a deliverable state: section 21
74. The Maxim “Nemo dat quad non habet” incorporated in section 27 of the Sale of Goods Act, 1930 means
- (A) an innocent and bona fide purchaser gets a proper title as of a true owner
 - (B) no man can pass a better title than he himself has
 - (C) the buyer must satisfy himself about the suitability of the goods for his purpose and he cannot blame the seller, if goods are unsuitable
 - (D) an innocent occupier of goods can pass a proper title
75. Minimum number of directors in case of a public company is
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
76. Transfer of shares in the case of public company is
- (A) Prohibited
 - (B) Restricted
 - (C) Freely transferable
 - (D) None of these
77. The doctrine of _____ does not apply to acts void abinitio?
- (A) Ultra Vires
 - (B) Intra Vires
 - (C) Constructive Notice
 - (D) Indoor management
78. _____ has power to exempt enterprise, practice or agreement from application of Competition Act, 2002.
- (A) Competition Commission
 - (B) Appellate tribunal
 - (C) Central Government
 - (D) State Government
79. What as per Competitive Act, 2002 refers to the sale of goods or provision of services, at a price which is below the cost to eliminate the competitors?
- (A) MRP
 - (B) Predatory price
 - (C) Preparatory price
 - (D) GST price
80. Which of the following is not the duty of Competition Commission?
- (A) To protect the interest of the investors
 - (B) To ensure freedom of trade carried on by other participants in markets in India and for matters connected therewith or incidental thereto
 - (C) To prevent practices having adverse effect on competition
 - (D) To promote and sustain competition in markets
81. Exemption from disclosure of information are laid down in _____ of RTI Act, 2005?
- (A) Section 7 of RTI Act, 2005
 - (B) Section 4 of RTI Act, 2005
 - (C) Section 5 of RTI Act, 2005
 - (D) Section 8 of RTI Act, 2005

82. How many schedules are there in Right to Information Act, 2005?
 (A) 08 (B) 06 (C) 04 (D) 02
83. The second schedule of the RTI Act, 2005 can be amended by
 (A) Central Government (B) State
 (C) Both (D) None of these
84. If public information officer fails to give information to the informant within the period specified under the Right to information Act, it is called _____?
 (A) Contempt (B) Holding Information
 (C) Timeout (D) Deemed Rejection
85. If the information sought under RTI Act, 2005 concerns the life or liberty of a person, the same shall be provided within?
 (A) 24 hours of its receipt (B) 48 hours of its receipt
 (C) Five days of its receipt (D) 10 days of its receipt
86. Adaptation in relation to an artistic work means :
 (A) Conversion of the work into a patent
 (B) Conversion of a work into trademark
 (C) Conversion of the work into a design
 (D) Conversion of a work into a dramatic work by way of performance in public or otherwise
87. Which of the following is incorrect in context of trademark, it is something that protects the :
 (A) The Symbols (B) The Colours (C) The Idea (D) The Design
88. Intellectual Property Right [IPR] protects the use of information and ideas that are of :
 (A) Ethical values (B) Social values
 (C) Commercial values (D) Sentimental values
89. Which of the following is not a type of patent :
 (A) Utility (B) Copyright (C) Design (D) Plant
90. GI tags for kandangi saree has been received by which state?
 (A) Bengal (B) Odisha (C) Uttar Pradesh (D) Tamil Nadu
91. A design can also be registered under :
 (A) Trademark Act (B) Patent Act
 (C) Geographical Indication Act (D) Copyright Act
92. Patent for the _____ is prohibited.
 (A) Traditional knowledge (B) Arms
 (C) Atomic Energy (D) Junk food

93. _____ may be strategies system formula or other confidential information of an organization that provides a competitive advantage in the market.
 (A) Patent (B) Trade Secrets (C) Copyrights (D) Trademarks
94. Digital signature certificate is _____ requirement under various applications
 (A) Statutory (B) Legislative (C) Governmental (D) Voluntary
95. Authentication is a process for _____
 (A) Confirming the identity of a person (B) Insertion
 (C) Modification (D) Regulation
96. Assessing computer without prior authorization is a cyber crime that comes under _____ of IT Act, 2000
 (A) Section 65 (B) Section 66 (C) Section 68 (D) Section 70
97. In the following case the Hon'ble Supreme Court struck down Section 66 A of I.T. Act.
 (A) Kartar Singh Versus State of Punjab (B) Menka Gandhi Versus Union of India
 (C) KA Abbas Versus Union of India (D) Shreya Singhal Versus Union of India
98. What is not the definition of hacking?
 (A) The gaining of unauthorized access to data in a system or computer
 (B) Breaking into computer system
 (C) Deliberate deception to secure unfair or unlawful gain
 (D) Authorised access
99. What type of Cyber Crime, its law and punishment does Section 66 C of the I.T Act, 2000 holds?
 (A) Hacking (B) Identity theft
 (C) Cheating (D) Stealing hardware components
100. Which of the below can be classified as a type of computer threat?
 (A) Dos Attack (B) Phishing (C) Soliciting (D) Both A and C

x-x-x

SPACE FOR ROUGH WORK

MCA

1. Find the next number in sequence, 0, 6, 24, 60, 120, 210, ?
(A) 240 (B) 420 (C) 370 (D) 336
2. Find missing in alphabetical series as, AYD, BVF, DRH, ?, KGL
(A) EMK (B) GLJ (C) GMJ (D) FMI
3. Find the correct relationship, Botany : Plants :: Entomology : ?
(A) Insects (B) Birds (C) Eyes (D) Flowers
4. If in a certain code, COVET is written as FRYHW, which word would be written as SHDUO?
(A) UKFVQ (B) QUAKE (C) PEARL (D) PEBQL
5. Pointing to Shyam, Rita said, "He is the son of my father's only son". How is Shyam mother related to Rita?
(A) Aunt (B) Sister-in-law (C) Mother-in-law (D) Daughter

Directions (Questions 6 to 8): On the basis of information provided below, answer these questions:

Six people A, B, C, D, E and F are sitting on the ground in a hexagonal shape. All the sides of the hexagon so formed are of same length. A is not adjacent to B or C; D is not adjacent to C or E; B and C are adjacent; F is in the middle of D and C.

6. Which of the following is not a correct neighbour pair?
(A) A and F (B) B and E (C) C and F (D) D and F
7. If one neighbour of A is D, who is the other one?
(A) E (B) B (C) C (D) F
8. Who is placed opposite to E?
(A) D (B) C (C) B (D) F
9. How many numbers from 1 to 100 are there each of which is not only exactly divisible by 4 but also has 4 as a digit?
(A) 8 (B) 25 (C) 7 (D) 20
10. In a row of forty children, P is thirteenth from the left end and Q is ninth from the right end. How many children are there between P and R if R is fourth to the left of Q?
(A) 15 (B) 14 (C) 13 (D) 11
11. Ram left home for the bus stop 15 minutes earlier than usual. It takes 10 minutes to reach the stop. He reached the stop at 8:40 a.m. What time does he usually leave home for the bus stop?
(A) 8:25 a.m. (B) 8:45 a.m. (C) 8:30 a.m. (D) 8:40 a.m.
12. If $P(A) = 0.8$, $P(B) = 0.5$ and $P(B|A) = 0.4$, what is the value of $P(A \cap B)$?

- (A) 1 (B) 0.25 (C) 0.1 (D) 0.32
13. If A is a square matrix of order 3 and $|A| = 5$, then the value of $|2A|$ is,
 (A) 40 (B) 36 (C) 30 (D) -40
14. The most similar word of CONCEIVE is,
 (A) IMAGINE (B) SPEAK (C) PRESENT (D) CONTRADICT
15. The most similar word of TACITURN is,
 (A) DELICATE (B) DISCUSS (C) UNSPOKEN (D) WEIRD
16. The antonym of COGNITIVE is,
 (A) INTELLECT (B) ILLOGICAL (C) JUSTIFY (D) COMMON
17. The antonym of WEILD is,
 (A) ATTEND (B) NEGLECT (C) STRONG (D) WEAK
18. How many such pairs of letters are there in the word CORPORATE each of which has as many letters in the same sequence between them in the word as in the English alphabet?
 (A) three (B) one (C) none (D) two
19. Fill suitable word, Because of his _____ habits, he could not save much money.
 (A) extravagant (B) frugal (C) unsavoury (D) bad
20. Fill suitable word, The robbers fell _____ amongst themselves over the sharing of the loot.
 (A) through (B) off (C) out (D) across
21. Fill suitable word, He crossed the broken bridge _____ warning.
 (A) in spite (B) in spite off (C) in spite of (D) in spite with
22. Sounding the same but spelt differently are called _____.
 (A) Synonyms (B) Homophonous (C) Symphonious (D) Saminymous
23. The pupil was asked to write _____ his name on the front page of the exercise book
 (A) in (B) about (C) with (D) down
24. A cube painted blue on all faces is cut into 27 small cubes of equal size. How many cubes are painted one oneface only?
 (A) 6 (B) 3 (C) 9 (D) 12
25. If set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is,
 (A) 11 (B) 30 (C) 0 (D) 720
26. The magnitude of the vector $6i + 2j + 3k$ is equal to
 (A) 49 (B) 11 (C) 7 (D) 36

27. In how many ways a committee consisting of 5 men and 3 women, can be chosen from 9 men and 12 women?
 (A) 1620 (B) 27720 (C) 30720 (D) 16270
28. The properties as, $m + (n + r) = (m + n) + r$ and $m(n + r) = mn + mr$ are called
 (A) Distributive and associative (B) Associative and distributive
 (C) Commutative and distributive (D) Commutative and associative
29. Encapsulation is part of,
 (A) Run-time programming (B) Structured programming
 (C) Procedural programming (D) Object oriented programming
30. Let X and Y are two numbers, then product of X and Y is,
 (A) $HCF(X, Y) \times LCM(X, Y)$ (B) $HCF(X, Y)/LCM(X, Y)$
 (C) $LCM(X, Y)$ (D) $HCF(X, Y)$
31. What are the degrees of constant and linear polynomial?
 (A) 1 and 1 (B) 1 and 0 (C) 0 and 1 (D) 0 and 2
32. In a class, $\frac{3}{5}$ of the students are girls and rest are boys. If $\frac{2}{9}$ of the girls and $\frac{1}{4}$ of the boys are absent, what part of the total number of students is present?
 (A) $\frac{23}{36}$ (B) $\frac{17}{36}$ (C) $\frac{23}{30}$ (D) $\frac{19}{36}$
33. What is value of $\sin 75^\circ$?
 (A) $(\sqrt{3})/2\sqrt{2}$ (B) $(\sqrt{3} + 1)/2\sqrt{2}$ (C) $1/(2\sqrt{2})$ (D) $(\sqrt{3} + 1)/\sqrt{2}$
34. A MegaByte (MB) contains,
 (A) 1024 bytes (B) 1000 kilobytes (C) 1024 kilobytes (D) 1000 bytes
35. Which of the following is not a language?
 (A) COBOL (B) BASIC (C) PASCAL (D) LASER
36. The full form of HTTP is,
 (A) Hypertext Transfer Policy (B) Hypertext Transfer Protocol
 (C) Hyper Transfer Text Protocol (D) Hypertext Transfer Time Protocol
37. The 2's complement of 10001 is,
 (A) 01111 (B) 01110 (C) 0111 (D) 11111
38. The correct ascending order of complexities of $\log(x)$, x , x^2 , 2^x ,
 (A) $\log(x)$, x , 2^x , x^2 (B) x , x^2 , 2^x , $\log(x)$
 (C) x , x^2 , $\log(x)$, 2^x (D) $\log(x)$, x , x^2 , 2^x
39. The NLP in computer science is,
 (A) Natural Logical Processing (B) New Language Parser
 (C) Natural Language Parser (D) Natural Language Processing
40. The CFG in computer science is,
 (A) Common Free Games (B) Context Fast Grammar

(C) Context Free Grammar

(D) Common Free Grammar

41. The selection, insertion, radix are types of,

(A) Searching Techniques

(B) Sorting Techniques

(C) Both Sorting and Searching Techniques

(D) Heuristic Techniques

42. What is the number of edges present in a complete graph having N vertices?

(A) $N + 1$

(B) $(N \times (N - 1))/2$

(C) $(N \times (N + 1))/2$

(D) N

43. For a given graph G having V vertices and E edges which is connected and has no cycles, which of the following statements is true?

(A) $V=E+1$

(B) $V=E-1$

(C) $E=V+1$

(D) $2V=E$

44. A graph with all vertices having equal degree is known as a,

(A) Bipartite graph

(B) Simple graph

(C) Regular graph

(D) Euler graph

45. What is the full name of FAT?

(A) File attribute table

(B) Format allocation table

(C) First allocation table

(D) File allocation table

46. Which of the following is not application software?

(A) MS word

(B) Windows 11

(C) Photoshop

(D) Wordpad

47. The decimal value of 101111 is,

(A) 32

(B) 48

(C) 49

(D) 47

48. If $f: R \rightarrow R$ be given by $f(x) = (3 - x^3)^{\frac{1}{3}}$, then $f \circ f(x)$ is,

(A) x^3

(B) x

(C) $(x^3 - 3)$

(D) $(3 - x^3)$

49. If $f: R \rightarrow R$ be given by $f(x) = x^2$, then

(A) f is one-one

(B) f is one-one and onto

(C) f is not one-one but onto

(D) f is neither one-one nor onto

50. The value of $\tan^{-1} \sqrt{3} - \cot^{-1}(-\sqrt{3})$ is equal to

(A) $\pi/2$

(B) 0

(C) $-\pi/2$

(D) $\sqrt{3}$

51. The number of all possible matrices of order 2×3 with each entry 0 or 1 is,

(A) 64

(B) 128

(C) 36

(D) 32

52. If area of a triangle is 35 square units with vertices $(2, -6)$, $(5, 4)$ and $(k, 4)$, then k value

(A) $-2, 12$

(B) $2, -12$

(C) $-2, -12$

(D) $2, 12$

53. If $x = 2at^2$ and $y = at^4$, then value of dy/dx is,

(A) at

(B) t^3

(C) at^2

(D) t^2

54. The covariance (x, y) values for $\sum x_i = 60$, $\sum y_i = 95$, $\sum x_i y_i = 574$, $n = 10$ is

(A) 5.74

(B) -1.4

(C) 1.4

(D) 0.4

55. Find the probability that in a random arrangement of letters of the word UNIVERSITY, two I's do not come together,
 (A) $\frac{4}{10}$ (B) $\frac{3}{5}$ (C) $\frac{4}{5}$ (D) $\frac{2}{5}$
56. Two dice are thrown simultaneously, find the probability of getting six as the product.
 (A) $\frac{1}{6}$ (B) $\frac{1}{9}$ (C) $\frac{4}{33}$ (D) $\frac{4}{9}$
57. If $P(\text{not } A) = 0.4$, $P(A \cup B) = 0.7$, where A and B are given to be independent events, find the value of $P(B)$.
 (A) 0.75 (B) 0.25 (C) 0.3 (D) 0.28
58. A problem is given to three students whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. What is the probability that the problem will be solved?
 (A) $\frac{1}{24}$ (B) $\frac{1}{4}$ (C) $\frac{3}{24}$ (D) $\frac{3}{4}$
59. A speaks truth 5 times out of 6 and B speaks truth 9 times out of 10. What is the probability that they contradict each other in stating the same facts?
 (A) $\frac{7}{30}$ (B) $\frac{3}{4}$ (C) $\frac{1}{60}$ (D) $\frac{1}{3}$
60. A fair coin is tossed 7 times. Find the probability of obtaining at least 5 tails.
 (A) $\frac{1}{35}$ (B) $\frac{7}{125}$ (C) $\frac{29}{128}$ (D) $\frac{35}{128}$
61. The value of $\lim_{x \rightarrow 2} \frac{x-2}{2 - (\sqrt{6-x})}$ is,
 (A) 4 (B) 2 (C) -2 (D) 0
62. If $y = \sqrt{\cos(x) + \sqrt{\cos(x) + \sqrt{\cos(x) + \dots}}}$, then value of $\frac{dy}{dx}$ is,
 (A) $\frac{\cos(x)}{2y-1}$ (B) $\frac{\sin(x)}{1-2y}$ (C) 0 (D) $\frac{\cos(x)}{1-2y}$
63. Find the point on the curve $y = x^2 - 4x + 3$, the normal at which is parallel to the line whose slope is $\frac{1}{2}$.
 (A) (0,1) (B) $(\frac{1}{2}, 0)$ (C) $(0, \frac{1}{2})$ (D) (1, 0)
64. The value of $\int_0^1 \frac{1-x}{1+x} dx$ is,
 (A) 1 (B) $\log 2$ (C) $2 \log 2 - 1$ (D) $1 + 2 \log 2$
65. The value of $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \sin^2 x dx$ is,
 (A) $\frac{\pi}{4}$ (B) $\frac{1}{2}$ (C) $\frac{\pi}{4} - \frac{1}{2}$ (D) $\frac{\pi}{4} + \frac{1}{2}$
66. The $\cos(A + B)$ is equal to,
 (A) $\cos A \cos B - \sin A \sin B$ (B) $\cos A \sin B + \sin A \cos B$
 (C) $2 \cos A \cos B$ (D) $\cos A \cos B + \sin A \sin B$
67. The coordinates of the point where the line passing through the points (1,3,4) and (2, -4,6) crosses the xy plane.

- (A) (2,17,0) (B) (-1,17,0) (C) (0,17,1) (D) (2, -17, 0)
68. If $z_1 = 2 + 8i$ and $z_2 = 1 - i$, then value of $|\frac{z_1}{z_2}|$ is ,
 (A) $\sqrt{17}$ (B) 24 (C) 15 (D) $\sqrt{34}$
69. For all $n \in N$, $3 \cdot 5^{2n+1} + 2^{3n+1}$ is divisible by
 (A) 21 (B) 23 (C) 17 (D) 9
70. The number of ways 4 men and 3 women can be seated in a row so that they are alternate is,
 (A) 12 (B) 24 (C) 72 (D) 144
71. If x, y and z are in arithmetic progression then,
 (A) $z^2 = x + y$ (B) $2y = x + z$ (C) $2z = x + y$ (D) $2x = y + z$
72. Two lines are said to be perpendicular if the product of their slope is equal to:
 (A) -1 (B) 1 (C) 0 (D) $\frac{1}{2}$
73. The contrapositive of the statement "If p , then q ", is
 (A) If q , then p . (B) If p , then $\sim q$. (C) If $\sim q$, then $\sim p$. (D) If $\sim p$, then $\sim q$.
74. Let a and b be natural numbers. If $a^2 + ab + a = 14$ and $b^2 + ab + b = 28$, then $(2a + b)$ equals to
 (A) 7 (B) 12 (C) 8 (D) 10
75. All the vertices of a rectangle lie on a circle of radius R . If the perimeter of the rectangle is P , then the area of the rectangle is
 (A) $\frac{P^2}{8} - 2R^2$ (B) $2RP$ (C) $\frac{P^2}{4} - 2PR$ (D) $\frac{P^2}{2} - 2R^2$

$x-x-x$

Masters in Public Health

1. Which one of the following organizations is meant for protection of human health from environmental harms?
(A) Environment and Human Health (B) Environmental and Scientific Science
(C) Ecological Protection Organization (D) Ecological Science and Solutions
2. Unhealthful intake of dietary nutrients is termed as
(A) Healthy food (B) Foul food (C) Malnutrition (D) Nutritious food
3. What percentage of human body consists of water?
(A) 50% (B) 60% (C) 70% (D) 80%
4. According to guideline recommended by WHO for quality of water, how many E coli in distribution system per 100 ml of water is permitted:
(A) 0 (B) 50 (C) 100 (D) 5
5. What colour of bin is used for collection of sharp waste
(A) black (B) yellow (C) red (D) blue
6. In Pneumoconiosis all are included except
(A) Asbestosis (B) Silicosis (C) Anthracosis (D) Bagasosis
7. Which is used in HIST method of pasteurization?
(A) 63 deg C for 30 min (B) 72 deg C for 15 sec
(C) 135 deg for 1 sec (D) None of the above
8. When is world TB day celebrated
(A) 7th April (B) 24th March (C) 1st Dec (D) 24th June
9. In which disease man is the incidental host and pig-mosquito- pig being the basic cycle
(A) Japanese encephalitis (B) Chikungunia
(C) Malaria (D) KFD
10. Measure of dispersion is
(A) Mean (B) Median (C) Standard deviation (D) Range
11. Iodine can be used to disinfect
(A) Water (B) Urine (C) Faeces (D) Skin
12. Influenza pandemic occurs after every 7 – 10 years. This kind of disease distribution in time is known as:
(A) Secular trend (B) Short time fluctuation
(C) Cyclical trend (D) Seasonal trend
13. Bhopal gas tragedy is an example of:
(A) Slow epidemic (B) Continuous epidemic
(C) Point source epidemic (D) Propagated epidemic
14. An outbreak of brucellosis in cattle is reported, threatening the health of human population. This outbreak is:
(A) Epizootic (B) Epornithic (C) Enzootic (D) Exotic
15. Which is the best method for preventing diarrhoeal outbreak in a community in the long run is:
(A) Anti-diarrheal drugs (B) Immunization against cholera and typhoid

- (C) Provision of sanitary latrine (D) Use of boiled water
16. Most important reason for recommending oral polio vaccine in the polio eradication campaign instead of injectable vaccine is:
 (A) Provides 90% immunity in one dose (B) Does not interfere with vertical immunity
 (C) Has been donated by WHO (D) Provides herd immunity
17. A seventh month pregnant woman reported in the antenatal clinic for the first time. The recommended immunization is by:
 (A) Tetanus toxoid (B) Hepatitis B vaccine
 (C) Rubella vaccine (D) Tetanus immunoglobulin
18. Water sample can be declared unfit for human consumption if the concentration of which chemical out of the given options is high.
 (A) Iodine (B) Calcium (C) Chlorides (D) Nitrite
19. A dental surgeon appointed in rural health centre reports an increased incidence of dental carries in the children. Which measure is required for this
 (A) Fluoridation of water (B) Chlorination of water
 (C) Use of bacterial filter (D) Use of boiled water
20. A Person working in compressed air chamber presented with symptoms of cough, dyspnoea and joint pains. This clinical presentation is suggestive of:
 (A) Pulmonary edema (B) Fat embolism
 (C) Air embolism (D) Rupture of spleen
21. The main disadvantage of the usage of Norplant as contraceptive is:
 (A) Spontaneous expulsion (B) Irregular menstrual bleeding
 (C) Pelvic inflammatory disease (D) Ectopic pregnancy
22. A pap smear and colposcopic examination for the early detection of cervical cancer and papilloma virus infection constitute which level of prevention
 (A) Primary prevention (B) Secondary prevention
 (C) Tertiary prevention (D) Medical treatment
23. Number of males per 100 females is known as
 (A) Sex ratio (B) Sex rate
 (C) Dependency ratio (D) Literacy rate
24. How much extra calories are required by a pregnant female
 (A) 450 kcal (B) 350 kcal (C) 550 kcal (D) 650 kcal
25. A 45 years old man has weight of 70 kg and height of 1.6 m. His BMI is 27.3. He is:
 (A) Under weight (B) Normal weight (C) Over weight (D) Obese
26. Legislation based on tobacco control will be adopted to prevent onset of the risk behaviour for Non Communicable Diseases. This level of prevention will be.
 (A) Primordial (B) Health promotion

- (C) Specific protection (D) Disability limitation
27. The commonest physical health hazard in most industries is:
 (A) Heat (B) Noise
 (C) Humidity (D) Ionizing radiation
28. Restriction of activities of the contact of a COVID-19, for maximum incubation period, is termed as:
 (A) Elimination (B) Quarantine (C) Surveillance (D) Isolation
29. "Dettol" is a commonly used antiseptic agent in the community. Its chemical name is:
 (A) Hexachlorophane (B) Chloroxylonol (C) Chlorhexidine (D) Cetrimide
30. The main headquarters of WHO are present in country?
 (A) Switzerland (B) France (C) America (D) England
31. Which one of the following gives the strength of association between the cause and the disease?
 (A) Prevalence rate (B) Case fatality rate
 (C) Odds ratio (D) Incidence rate
32. Koplik's spots are the diagnostic sign of one of the following diseases:
 (A) Rubella (B) Whooping cough
 (C) Measles (D) Meningitis
33. Which one of the following is not a risk factor for coronary heart disease?
 (A) Oral contraceptives (B) Alcohol abuse
 (C) High fibre diet (D) Type A personality
34. Which of the following is a symptom of Vitamin A deficiency
 (A) Bitot's spots (B) Anemia
 (C) Diarrhea (D) Bone deformities
35. Which of the following is present in a child having Kwashiorkor type of malnutrition:
 (A) Monkey face (B) Oedema
 (C) Obvious muscle wasting (D) Usually good appetite
36. The average weight gain for a pregnant woman with BMI 20 – 25 should be:
 (A) 4 to 8kg (B) 8 to 12kg (C) 12 to 16kg (D) 16 to 20 kg
37. House waste-water which does not contain human excreta is known as:
 (A) Humus (B) Sewage (C) Sludge (D) Sullage
38. Which of the following is not an indicator of air pollution?
 (A) Soiling index (B) Heavy metal pollution index
 (C) Suspended particulate matter (D) Sulphur dioxide
39. Which of the following is true about global warming?
 (A) Carbon dioxide is major greenhouse gas
 (B) Stratospheric ozone is harmful

- (C) CFC increase ozone level in stratosphere
- (D) Kyoto protocol called for 10% reduction in green house emission
40. Which of the following is not transmitted by hard ticks
 (A) Falaria (B) Kayasanur forest disease
 (C) Rocky mountain spotted fever (D) Tularemia
41. Instrument used to measure atmospheric pressure?
 (A) Anemometer (B) Barometer (C) Hygrometer (D) Psychrometer
42. Green house gas include all of the following except?
 (A) CO (B) CO₂ (C) Water vapour (D) CH₄
43. Killing power of a disease is best expressed by:
 (A) Attack Rate (B) Secondary Attack rate
 (C) Case fatality rate (D) Survival index
44. Which one of the following diseases will not have a human healthy carrier?
 (A) Cholera (B) Diphtheria (C) Salmonellosis (D) Hydatidosis
45. A student has come from Kenya, he must have a valid certificate of vaccination against:
 (A) TB (B) Yellow fever (C) Poliomyelitis (D) Mumps
46. Which one of the following is not a measure of central tendency?
 (A) Mean (B) Median (C) Mean deviation (D) Mode
47. Which one of the following gestational infections will result in congenital anomaly?
 (A) Chicken Pox (B) Candidiasis (C) Typhoid (D) Pneumonia
48. Mental retardation is seen in which of the following childhood conditions?
 (A) Trisomy 21 (B) Marasmus
 (C) Congenital HBV infection (D) Juvenile Diabetes
49. Self-administration of a drug for non-medical reasons in quantities and frequencies which may impair an individual's ability to function effectively and which may result in social, physical or emotional harm is best named as:
 (A) Drug dependence (B) Drug tolerance (C) Drug abuse (D) Self medication
50. Marijuana is derived from which one of the following plants?
 (A) Cannabis (B) Morning Glory (C) Coca bush (D) Mushrooms
51. Germ theory of disease was given by
 (A) Leeuwenhoek (B) Robert Koch (C) Louis Pasteur (D) Robert Brown
52. Which of the following dimensions is not included in the WHO definition of health?
 (A) Physical well being (B) Occupational well being
 (C) Mental well being (D) Social well being

53. Any restriction or lack of ability to perform an activity in the manner or within the Range considered normal for a human being called:
 (A) Impairment (B) Handicap (C) Disability (D) Disease
54. The most effective tool for measuring incidence of a disease in a community is:
 (A) Case control study (B) Cohort study
 (C) Cross sectional study (D) Cross over study
55. If a drug prevents mortality but does not affect cure, then which of the following will be true:
 (A) Incidence will decrease (B) Incidence will increase
 (C) Prevalence will decrease (D) Prevalence will increase
56. All are true regarding propagated epidemic except
 (A) Progresses slowly (B) No secondary waves occur
 (C) Person to person transmission occurs (D) Spread depends on herd immunity
57. All of the following are characteristics of a case control study except
 (A) Least risk to subjects (B) Rapid and cost-effective
 (C) Risk factors can be identified (D) Less prone to bias
58. Berksonian bias refers to the bias arising from:
 (A) Different rates of admission to the hospital
 (B) The cases not being representative of the general population
 (C) Presence of confounding factors
 (D) Improper selection of cases
59. The well known Framingham Heart Study' is an example of:
 (A) Case control study (B) Nested case control study
 (C) Cohort study (D) Randomization study
60. Which of the following is not a suitable agent for disinfection of faeces and urine?
 (A) 5% cresol (B) 1-2% formalin
 (C) 5% bleaching powder (D) 10% phenol
61. Vertical transmission of a disease is by
 (A) Mosquito (B) Direct contact
 (C) Droplet (D) Placenta
62. Which of the following is not a notifiable disease in India
 (A) Tuberculosis (B) Cholera (C) Malaria (D) Influenza
63. Daily req. of protein is
 (A) 1 mg per kg (B) 2 mg per kg (C) 3 mg per kg (D) 4 mg per kg
64. Egg has all vitamins except
 (A) B1 (B) B6 (C) C (D) E

65. Oral vit. A prophylaxis is given to children every
 (A) 2 months (B) 6 months (C) 9 months (D) 1 year
66. Anganwadi are under:
 (A) Ministry of health and family welfare (B) Ministry of labour
 (C) ICDS scheme (D) PHC
67. Birth and death registration should be done within how many days?
 (A) 3 (B) 7 (C) 14 (D) 30
68. The highest quantity of vit. C is found in
 (A) Orange (B) Lemon
 (C) Indian gooseberry (D) Grapes
69. Weaning from breast feeding should be started after how many months
 (A) 3 (B) 6 (C) 9 (D) 12
70. Low birth weight baby means weight less than
 (A) 2.8 Kg. (B) 2.7 Kg. (C) 2.3 Kg. (D) 2.5 Kg.
71. The proportion of disease incidence that can be attributed to a specific exposure
 (A) Relative risk (B) Odds ratio
 (C) Attributable risk (D) Potential risk
72. Society can be defined as
 (A) System of social relationship between individuals
 (B) Social relationship between families
 (C) Intervention by people
 (D) Relationship of individual, family and country
73. Virulence of a disease is
 (A) Proportional mortality rate (B) Specific mortality rate
 (C) Case fatality ratio (D) Amount of GDP spent on disease
74. The method of detecting missing contacts in a disease is
 (A) Screening (B) Monitoring
 (C) Active surveillance (D) Passive surveillance
75. Objectives of health services include all except
 (A) Delivery of curative care (B) Health promotion
 (C) Prevention, control or eradication of disease (D) Treatment and rehabilitation

x-x-x

M.A.(Geography)

1. Chinook is a warm wind blowing on
 - (A) The windward western slopes of the Rockies
 - (B) The southern slopes of the Alps
 - (C) The northern slopes of the Alps
 - (D) The leeward eastern slopes of the Rockies
2. Which of the following statements is a characteristic of the south-west monsoon season:
 - (A) The wind blows from the mainland to Bay of Bengal
 - (B) The wind blows from Bay of Bengal to the mainland
 - (C) The ITCZ shifts south of the equator
 - (D) Sub-tropical Jet stream shifts to the south of the Himalayas
3. The scale of a Degree Sheet among Topographical sheets is:
 - (A) 1:100000
 - (B) 1:250000
 - (C) 1:1000000
 - (D) 1:25000
4. Ghetto was originally a quarter of the city inhabited by the:
 - (A) Afro-Americans in U.S.A
 - (B) Spanish in South America
 - (C) Jews in Europe
 - (D) Mexicans in U.S.A
5. Von Theunen in 1826 presented a model on:
 - (A) Distribution of central places
 - (B) Agricultural Location
 - (C) Agricultural Marketing
 - (D) Location of Industry
6. Which of the following is not a term used to refer to the city region?
 - (A) Hinterland
 - (B) Umland
 - (C) Tributary Area
 - (D) Metropolis
7. Population Distribution is usually shown by:
 - (A) Choropleth Method
 - (B) Isopleth Method
 - (C) Chorochromatic Method
 - (D) Dot Method
8. The theory of Plate Tectonics was first published by
 - (A) W.J. Morgan in 1953
 - (B) Tuzo Wilson in 1953
 - (C) W.J. Morgan in 1962
 - (D) C. Dutton in 1889
9. Which one of the following passes is located in the Zaskar Range?
 - (A) Indravar Pass
 - (B) Bara Lacha La
 - (C) ZojiLa
 - (D) Mana Pass
10. Which of the following is a tributary of the Ganga?
 - (A) Kishenganga
 - (B) Penganga
 - (C) Ramganga
 - (D) Dudhganga
11. Continental Drift Theory was propounded by:
 - (A) Harry Hess
 - (B) Alfred Wegener
 - (C) A. Hobbes
 - (D) D.L. Holms
12. Narmada River flows through a
 - (A) Synclinal valley
 - (B) U-shaped valley
 - (C) Rift Valley
 - (D) Eroded Valley
13. Which of the following is not considered a characteristic feature of wind erosion?
 - (A) Loess plains
 - (B) Yardangs
 - (C) Blow-out
 - (D) Zeugen

14. Which is the geologically youngest physiographic division of India?
 (A) Great Northern Plains (B) Great Indian Plateau
 (C) Greater Himalayas (D) The Coastal Plains
15. Schaeffer argued that Geography was a
 (A) Chorological Science (B) Spatial Science
 (C) Regional Science (D) Systematic Science
16. Which of the following is not a Ramsar Site of India?
 (A) Wular Lake (B) Tso Moriri
 (C) Surinsar-Mansar Lakes (D) Pangong Tso
17. The aim of “Agenda 21” adopted at Rio-Earth Summit was to strive for
 (A) Sustainable Development (B) Gender equality
 (C) Reducing Carbon Emissions (D) Reducing Ozone Depletion
18. Settlements on a topographical sheet are shown in which colour?
 (A) Brown (B) Black (C) Green (D) Red
19. Which of the following is true of a footloose industry?
 (A) It can be located anywhere (B) It needs no raw material
 (C) It needs no capital (D) It deals with the manufacture of footwear
20. pH value of moderately acidic soils varies between
 (A) 4.5 to 5.4 (B) 7.5 to 8.5 (C) 5.5 to 6.4 (D) 6.5 to 7.4
21. Who suggested the term Biome?
 (A) Frederic Clements (B) Paul Vidal de la Blache
 (C) Alfred Hettner (D) Charles Darwin
22. “Sudan Climate” is another name for
 (A) Savannah type climate (B) Monsoon Climate
 (C) Wet Tropical Climate (D) Equatorial type Climate
23. The tropic of Cancer passes through the following states in India:
 (A) Gujarat, Rajasthan, Jharkhand and Orissa
 (B) Gujarat, Madhya Pradesh, Chhattisgarh and Mizoram
 (C) Jharkhand, Rajasthan, Madhya Pradesh and Bihar
 (D) West Bengal, Jharkhand, Manipur and Orissa
24. Which of the following is not an instrument for map reduction and enlargement:
 (A) Ergograph (B) Pantograph (C) Eidograph (D) Proportional Compass
25. Which among these is the youngest Union Territory of India?
 (A) Pudducherry (B) Delhi (C) Ladakh (D) Chandigarh
26. Which of the following does not share a border with Tibet?
 (A) Arunachal Pradesh (B) Uttarakhand (C) Sikkim (D) Jammu and Kashmir

27. Among the following States, which has the largest population?
 (A) Gujarat (B) Karnataka (C) Orissa (D) Tamil Nadu
28. Sandal Bar lies between
 (A) Ravi and Satluj (B) Chenab and Ravi
 (C) Satluj and Beas (D) Jhelum and Chenab
29. What is "Gwadar"?
 (A) A city of Saudi Arabia (B) A port in Pakistan
 (C) An oilfield in Iraq (D) An oilfield in Saudi Arabia
30. What is "Raniganj"?
 (A) The oldest coalmine in India (B) The largest coalmine in India
 (C) The oldest copper mine in India (D) The deepest copper mine in India
31. Temperate Broadleaf vegetation is not found in
 (A) Sub-saharan Africa (B) Caucasus
 (C) North America (D) Himalayas
32. Ranching is practiced in:
 (A) Canada, U.S.A and Mexico (B) Bangladesh, India and Sri Lanka
 (C) Indonesia, Malaysia and Thailand (D) China, Japan and Tibet
33. Central Place Theory was given by
 (A) G.K. Zipf in 1933 (B) Walther Christaller in 1933
 (C) Walther Christaller in 1936 (D) August Losch in 1936
34. The concept of Population-Resource regions was given by
 (A) E.A. Ackerman (B) Malthus
 (C) Karl Marx (D) Thompson and Notestein
35. Bad-land Topography in India is found in
 (A) Chambal region (B) South-west Punjab
 (C) Northern Bihar (D) Saurashtra
36. The Trans-Siberian Railway connects :
 (A) Petersburg with Moscow (B) Moscow with Vladivostok
 (C) Baku with Leningrad (D) Moscow with London
37. Star Diagrams are made to show:
 (A) Direction of winds (B) Direction and Frequency of winds
 (C) Movement of traffic (D) Movement of Population
38. Falkland Islands are located in which of the following oceans?
 (A) Atlantic (B) Pacific (C) Indian (D) Arctic
39. Fog occurring at the Grand Banks of Newfoundland in summer is an example of:

- (A) Radiation Fog (B) Advection Fog (C) Inversion Fog (D) Frontal Fog
40. Line graphs are used to represent
 (A) Trends (B) Continuous data
 (C) Quantitative data (D) Trends, continuous and quantitative data
41. Rudrasagar one of the important oilfields in India, is located in
 (A) Gujarat (B) Assam (C) Maharashtra (D) Andhra Pradesh
42. Which among the following has the highest albedo?
 (A) Snow (B) Concrete surfaces (C) Forests (D) Metalled road
43. The Pass which connects the valley of Lahaul with the valley of Spiti is
 (A) Bara Lacha La (B) Kunzum Pass
 (C) Rohtang Pass (D) Chanderkhani Pass
44. Irrigation Intensity of any state is best represented by
 (A) Dot Method (B) Isopleth (C) Choropleth (D) Pie diagram
45. Heartland Theory was propounded by
 (A) Mackinder (B) Ratzel (C) Haushofer (D) Isaiah Bowman
46. Harike Pattan is the confluence of:
 (A) Satluj and Ravi (B) Ravi and Beas (C) Satluj and Beas (D) Ravi and Chenab
47. Cirques are the outcome of
 (A) Glacial erosion (B) Wind deposition (C) River deposition (D) Glacial deposition
48. Who of the following is known as the father of Geography?
 (A) Eratosthenes (B) Herodotus (C) Anaximander (D) Thales
49. The Tropical Rainforest biome is usually associated with
 (A) Wet and Warm climate (B) Equatorial wet climate
 (C) Tropical dry climate (D) Monsoon climate
50. Where in India have lithium reserves been recently discovered?
 (A) Himachal Pradesh (B) Bihar
 (C) Jammu & Kashmir (D) Gujarat
51. Which of these is the oldest steel plant?
 (A) Bhilai (B) Durgapur (C) Vishakhapatnam (D) Rourkela
52. Which of the following diagrams depicts the relationship of rainfall and temperature?
 (A) Hythergraph (B) Climograph (C) Ergograph (D) Band graph
53. The idealised global pattern of surface wind from the pole to equator is
 (A) Easterlies- westerlies- trade winds-doldrums
 (B) Easterlies- doldrums – westerlies – trade winds
 (C) Easterlies-westerlies-doldrums – trade winds
 (D) Easterlies-doldrums – trade winds –westerlies
54. Hurricanes occur in the

- (A) Indian Ocean (B) Atlantic Ocean
(C) South Pacific Ocean (D) Mediterranean Sea
55. The ancient kingdom of Gandhara was located in present day
(A) Baltistan (B) Balochistan (C) Pakhtunkhwa (D) Punjab
56. The revenue records of rural settlements can best be maintained on
(A) Wall maps (B) Cadastral maps (C) Geological maps (D) Topographical maps
57. India has the largest reserves of _____ in the world.
(A) Lithium (B) Copper (C) Mica (D) Gold
58. Lucknow is situated on the banks of which river?
(A) Ganga (B) Gomti (C) Ghaghra (D) Kosi
59. The standard parallel in a cylindrical projection lies
(A) At the Pole (B) On the Equator
(C) Between the Pole and the equator (D) At both pole and the equator
60. The earliest existing aerial photographs are of the city of:
(A) London (B) Boston (C) Amsterdam (D) New York
61. "The concept of Uniformitarianism was given by:
(A) W.M. Davis (B) James Hutton (C) Carl Sauer (D) A. Penck
62. Which of the following is formed as a result of glacial erosion?
(A) Hanging valley (B) V-shaped valley (C) Rift valley (D) Blind valley
63. Ferrel's Law explains the
(A) Rotation of the earth
(B) The formation of the Easterlies and Westerlies planetary winds
(C) Formation of Hadley Cell
(D) Lorenz curve
64. The Ranjit Sagar Dam has been built on which river?
(A) Satluj (B) Chenab (C) Ravi (D) Narmada
65. The term Hapta Hendu used to refer to Punjab occurs in:
(A) Avesta (B) Rigveda (C) Indica (D) Baburnama
66. The Majha region of Punjab includes the districts of:
(A) Jalandhar and Amritsar (B) Amritsar and Tarn Taran
(C) Ludhiana and Jalandhar (D) Amritsar and Hoshiarpur
67. Winter rainfall in Tamil Nadu is mainly due to
(A) Western disturbance (B) Retreating Monsoon
(C) Advancing Monsoon (D) Depression in the Bay of Bengal
68. Which one of the following indicates the principle of administration in Central Place Theory?
(A) K3 (B) K4 (C) K7 (D) K9

69. Roca is a form of
 (A) Shifting Cultivation (B) Commercial Grain Farming
 (C) Intensive Agriculture (D) Vegetable Farming
70. Commercial Grain Farming is not practiced in which of the following regions?
 (A) Canada (B) Argentina (C) U.S.A (D) Japan
71. Which of the following seas is not a part of the Pacific Ocean?
 (A) Bering Sea (B) Philippine Sea (C) Aegean Sea (D) Tasman Sea
72. Carthage of the Phoenician Civilisation is located in
 (A) Argentina (B) Algeria (C) Tunisia (D) Peru
73. The normal cycle of erosion was propounded by
 (A) William Morris Davis (B) Albert Penck
 (C) Walther Isaard (D) Hutton
74. The cold current flowing along the coast of South Africa, Namibia and Angola is:
 (A) Benguela (B) EL-Nino (C) Humboldt (D) Canary
75. The Munda tribe is found in
 (A) Rajasthan (B) Chhattisgarh (C) West Bengal (D) Assam

x-x-x

Masters in Disaster Management

1. Tropical Evergreen Forests are found in the areas of rainfall ranging between
(A) Less than 100 cms (B) 100 – 200 cms (C) 200-300 cms (D) More than 300 cms
2. Which of the following agents is responsible for yellowing of Taj Mahal?
(A) Sulphur (B) Chlorine (C) Sulphur dioxide (D) Nitrogen dioxide
3. Which one of the following was first to put forward the concept of 'life form' among plants in 1934?
(A) A S. Moffat (B) Christen Raunkiaer
(C) R.H. Whittaker (D) E.O. Box
4. Which one of the following terms is appropriate for the mixing zone of two biomes?
(A) Environment (B) Ecology (C) Ecosound (D) Ecotones
5. The sequences of development of ecosystem is referred to as
(A) Sere (B) Cyclic stability (C) Niche (D) Climax
6. Identify the correct statement regarding negative soil pollution.
(A) Contamination of the soil due to addition of insecticides
(B) Reduction in soil productivity due to soil erosion
(C) Reduction in soil productivity due to the addition of pesticides and herbicides
(D) Contamination of the soil due to natural disasters
7. Which of the following is not a conventional energy resource?
(A) Petrol (B) LPG (C) Tidal energy (D) Coal
8. Which among the following have a large amount of installed grid interactive renewable power capacity in India?
(A) Wind power (B) Solar Power (C) Biomass Power (D) Small Hydro Power
9. The number of Sustainable Development Goals is
(A) 13 (B) 15 (C) 17 (D) 19
10. Which of the following is not a Sustainable Development Goal?
(A) Gender equity (B) Climate action
(C) Protection of Ozone layer (D) Life below water
11. The concept of Sustainable Development is related to
(A) Maximum use of resources (B) The conservation of resources
(C) Industrial use of resources (D) Development of power resources
12. The Millennium Development Goals (MDGs) were measured by how many targets and how many indicators?
(A) 21 targets and 60 indicators (B) 22 targets and 70 indicators
(C) 25 targets and 90 indicators (D) 28 targets and 120 indicators
13. What is the 3 R's strategy that is useful and practiced for conserving natural resources:
(A) Reduce, Reuse, Recycle (B) Recycle, Regenerate, Reuse
(C) Reduce, Regenerate, Reuse (D) Reduce, Reuse, Redistribute

14. Which one of the following terms is appropriate for plants that endure seasonal climatic fluctuations from year to year?
 (A) Perennials (B) Annuals (C) Seasonal (D) Bi-annuals
15. A terrestrial ecosystem that covers a large geographical area is called as
 (A) Ecology (B) Environment (C) Biome (D) Biosphere
16. Which one of the following is an essential macro nutrient for plant growth?
 (1) Iron (2) Copper (3) Potassium (4) Nickel
 (A) (1) (B) (2) (C) (3) (D) (4)
17. India has how many major bio-geographic regions?
 (A) 7 (B) 8 (C) 9 (D) 10
18. The transition zone between two ecosystems is called
 (A) Biotope (B) Ecotone (C) Biome (D) Habitat
19. Which of the following does NOT form an essential part of the process of photosynthesis?
 (1) Sunlight (2) Carbon dioxide (3) Nitrogen (4) Water
 (A) (1) (B) (2) (C) (3) (D) (4)
20. Consider the following statements and which of the following options is correct: -
1. Food web is referred as an energy sequence of links that starts with a species that eats no other species and ends with a species that is eaten by no other.
 2. The number of species, total biomass and energy availability tends to decrease from the base to the top of the trophic level.
 3. The structure of various ecological pyramids remains constant i.e. broad base and thin apex.
 4. The presence of a simple food chain implies ecosystem instability and poor biodiversity.
- (A) 1 and 2 (B) 2 and 4 (C) 1, 2 and 4 (D) 1 and 4
21. The representation of nature by the food webs is _____.
 (A) Easy (B) Distorted (C) Simple (D) Clear
22. Which one of the following statements is true?
1. Arctic snow-covered areas have intermediate ecological productivity.
 2. Temperature is the limiting factor for desert areas in relation to ecological productivity.
 3. The primary productivity of a natural ecosystem largely depends on the amount of solar radiation.
 4. The herbivores are called as secondary consumers.
- (A) 1 (B) 2 (C) 3 (D) 4
23. Given below are two statements, one labeled as Assertion (A) and the other labeled as Reason (R). Select your answer from the code given below:
 Assertion (A): The regional boundaries of biomes are some-what arbitrary.

Reason (R): All kinds of major biomes are existing both in ocean and land.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true, but (R) is not a correct explanation of (A).

(C) (A) is true, but (R) is false.

(D) (A) is false, but (R) is true.

24. What is noise?

(A) Desirable sound

(B) Desirable and unwanted sound

(C) Undesirable and unwanted sound

(D) Undesirable and wanted sound

25. Which method of electricity production is non-polluting?

(A) Water energy

(B) Solar energy

(C) Nuclear energy

(D) Soil energy

26. How will climate change affect future food security?

(A) It will have negative impacts in most developing countries because of the increased frequency of droughts, storms and floods.

(B) The impact will be positive, because drier weather will mean less habitat for malaria mosquitoes, so fewer workers will be sick at harvest time.

(C) The impact will be positive because there will be more carbon dioxide available for plant photosynthesis.

(D) There currently is no scientific consensus as to whether climate change is occurring or whether it will over the next 50 years.

27. Cities often spread out over the surrounding areas. This is called_____.

(A) Urban spread

(B) Urban growth

(C) Urban overflow

(D) Urban sprawl

28. According to the Sustainable Development Goal 13, the biggest threat towards development is

(A) Population growth

(B) Pollution

(C) Climate change

(D) Melting of ice caps

29. Given below are the two statements, one labeled as Assertion (A) and the other labeled as Reason (R). Select your answer from the code given below:

Assertion (A): Energy flow shifts from production to respiration in the Eutrophication stage, with oxygen demand exceeding oxygen availability.

Reason (R): Stratospheric ozone layer depletion causes skin diseases.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).

(B) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(C) (A) is true but (R) is false.

(D) (A) is false but (R) is true.

30. Which of the following do NOT form part of a strategy of sustainable development?

(A) Relying more on organic farming.

(B) Reducing the use of personal vehicles and promoting public transport.

(C) Safeguarding the habitats of indigenous communities, flora and fauna.

(D) Not compromising on the needs of the present generation with respect to future generations.

31. Sustainable urban living is about balancing the needs of current generation with that of _____?
 (A) Past generation (B) Future generation (C) The government (D) The elderly
32. Given below are two statements, one is labelled as Assertion (A) and the other as Reason(R). Select the correct answer from the codes given below:
 Assertion (A): Sustainable development is important for well-being of human society.
 Reason (R): Sustainable development is a kind of development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
 (A) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (B) Both (A) and (R) are true but (R) is not the correct explanation of (A).
 (C) (A) is true, but (R) is false
 (D) (A) is false, but (R) is true
33. Collection of rainwater for future use is called
 (A) Rain water collection (B) Rain water pumping
 (C) Rain digging (D) Rain water harvesting
34. What does UNFCCC stand for?
 (A) United Nations Framework Control on Climate Change
 (B) United Nations Framework Convention on Climate Change
 (C) United Nations Framework Communications on Climate Change
 (D) United Nations Framework Climate Communications Council
35. Green-house effect is increasing due to
 (A) Change in atmospheric pressure
 (B) Change in number of green-house gases
 (C) Change in concentration of green-house gases
 (D) Melting of glaciers and dry atmospheric conditions
36. Which of the following is NOT a radioactive material?
 (A) Uranium (B) Radium (C) Plutonium (D) Sodium
37. In Global Warming the temperature of
 (A) Troposphere increase (B) Ionosphere increase
 (C) Mesosphere increase (D) Stratosphere increase
38. The main contributors of acid rain are
 (A) Sulphur oxides and carbon oxides (B) Nitrogen oxides and sulphur oxides
 (C) Carbon dioxide and carbon monoxide (D) Nitrogen oxides and carbon oxides
39. Where in India does it get the most rainfall each year?
 (A) Mawsynram (B) Cherrapunji (C) Siju (D) Pelling
40. What does CPCB stand for?
 (A) Central Particulate Control Board (B) Central Panama Channel Board
 (C) Central Pollution Control Board (D) Central Pollution Channel Board

41. The depletion in the Ozone layer is caused by:
 (A) Carbon dioxide (B) Nitrous oxide
 (C) Methane (D) Chlorofluorocarbon
42. Which of the following is not the consequence of ozone layer depletion?
 (A) Increased ultraviolet rays
 (B) Tides
 (C) Malignant melanoma-Another form of skin cancer
 (D) Cyanobacteria are sensitive to UV radiation and would be affected by its increase
43. Which of the following is biological method of disposal of Municipal Solid Waste?
 (A) Landfilling (B) Pulverization (C) Composting (D) Shredding
44. Name the method of solid waste disposal in which municipal solid waste is burned in a properly designed furnace under standard operating conditions and suitable temperature
 (A) Landfill (B) Recycling (C) Vermicomposting (D) Incineration
45. The Environment Protection Act, 1986, was enacted under which article of the Indian Constitution
 (A) Article 48A (B) Article 51A (C) Article 135 (D) Article 253
46. Which of the following is not a Sustainable Development Goal targeted to be achieved by 2030?
 (A) Gender Equality (B) Space Research
 (C) Zero Hunger (D) Good Health and Well Being
47. NGT (National Green Tribunal) was established in which year
 (A) 2005 (B) 2006 (C) 2010 (D) 2016
48. Who spearheaded the Chipko Andolan
 (A) Arun Sharma (B) Bisham Trivedi (C) Medha Patkar (D) Sunderlal Bahuguna
49. CITES is an international treaty on
 (A) Air Pollution
 (B) Water Pollution
 (C) Conservation of Endangered plants and animals
 (D) Noise Pollution
50. BOD and COD stand for?
 (A) Biochemical Oxygen Demand and Chemical Oxygen Demand
 (B) Chemical Oxygen Demand and Biological Oxygen Demand
 (C) Botanical Oxygen Demand and Chemical Oxygen Demand
 (D) Basic Oxygen Demand and Chemical Oxygen Demand
51. Living Planet Report is published by
 (A) International Union for Conservation of Nature
 (B) World Wide Fund for Nature
 (C) Ministry of Environment, Forest and Climate Change
 (D) World Nature Organization

52. Where is Tropical Forest Research Institute located in Madhya Pradesh?
 (A) Jabalpur (B) Indore (C) Bhopal (D) Rewa
53. The first environmental law in India was enacted in
 (A) 1947 (B) 1950 (C) 1972 (D) 1982
54. Every year Earth day is celebrated on
 (A) March 22 (B) April 22 (C) May 22 (D) June 22
55. Photovoltaic energy is the conversion of sunlight into:
 (A) Chemical energy (B) Biogas
 (C) Electricity (D) Geothermal energy
56. Who coined the term Ecosystem?
 (A) A. G. Tansley (B) Charles Darwin (C) Eduard Suess (D) Vladimir Vernadsky
57. Which one of the following locations in India is least prone to any kind of natural disasters as compared to others?
 (A) Ahmedabad (B) Vishakhapatnam (C) Vidisha (D) Kangra
58. In a given food chain of a terrestrial ecosystem, an animal which is strictly herbivore will necessarily be classified as a:
 (A) Primary producer (B) Tertiary consumer
 (C) Secondary consumer (D) Primary consumers
59. Integrated Child Development Scheme was started in which year
 (A) 1975 (B) 1983 (C) 2007 (D) 1978
60. Which of the following are the ex-situ methods of biodiversity conservation?
 1. Botanical Garden
 2. Biosphere Reserve
 3. Zoo
 4. Wildlife Sanctuary
 Select the correct answer using the code given below.
 (A) 1, 2 and 4 only (B) 1, 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3
61. India has started several ambitious projects/acts over the years to conserve wildlife. In this context, which of the following project/Act was introduced earliest?
 (A) Project Tiger (B) Project Elephant
 (C) Project Crocodile (D) Environment Protection Act
62. The proposed Ratle Hydro project will be on which river?
 (A) Beas (B) Indus (C) Jhelum (D) Chenab
63. Which of the following national park was selected for the Cheetah reintroduction project in India?
 (A) Bandhavgarh National Park (B) Manas National Park
 (C) Kuno National Park (D) Agasthyamala National Park
64. Which of the following Sustainable Development Goal so far has been achieved by any State/UT of India?

- (A) SDG 5 (Gender Equality)
 (B) SDG6 (Clean Water and Sanitation)
 (C) SDG7 (Affordable and Clean Energy)
 (D) SDG8 (Decent Work and Economic Growth)
65. Which of the following is a disadvantage of most of the renewable energy sources?
 (A) Highly polluting (B) High waste disposal cost
 (C) High running cost (D) Unreliable supply
66. The temperate grasslands in northern Europe are known as
 (A) Pampas (B) Prairies (C) Vied (D) Steppes
67. India has set the target to achieve Net Zero Carbon emission by
 (A) 2045 (B) 2070 (C) 2075 (D) 2090
68. Generally, the numbers on the Richter Scale range between
 (A) 0 and 6 (B) 0 and 9 (C) 1 to 5 (D) 1 to 12
69. Which of the following is not a greenhouse gas?
 (A) Nitrogen (B) Ozone (C) Carbon Dioxide (D) Methane
70. Which of the following national parks in India is located south of the tropic of cancer?
 (A) Keoladeo National Park (B) Rajaji National Park
 (C) Namdapha National Park (D) Simlipal National Park
71. Which among the following is the closest to the meaning of “Silviculture”?
 (A) Cultivation of Silk Worms (B) Cultivation of Textile Crops
 (C) Forest Development (D) Cultivation of Timber
72. _____ is ratio of the nonworking population (under 15 years old and over 64 years old) to the working age-population.
 (A) Labour force participation rate (B) Per capita population ratio
 (C) Population transition (D) Dependency ratio
73. The nodal agency chosen for conducting National Family Health Survey in India?
 (A) National Institute of Health and Family Welfare (NIHFW), New Delhi
 (B) International Institute for Population Sciences (IIPS), Mumbai
 (C) National Institute of Nutrition (NIN), Hyderabad
 (D) Tata Institute of Social Sciences (TISS), Mumbai
74. Some salient features of a census are
 1. Selectivity
 2. Simultaneity
 3. Universality
 4. Periodicity
 Find out the correct combination of answer from the codes given below:
 (A) 1, 2 and 3 are correct (B) 2, 3 and 4 are correct
 (C) 1, 3 and 4 are correct (D) 1, 2 and 4 are correct
75. Every year International day for Disaster Risk Reduction is held on
 (A) August 15 (B) September 5 (C) October 13 (D) November 14

x-x-x

M.Com.(Business Economics)

1. A discriminating monopolist will charge a lower price in the market in which price elasticity of
(A) Demand is greater (B) Supply is smaller
(C) Demand is smaller (D) Supply is greater
2. The concept of kinked demand has been propounded by
(A) Paul Samuelson (B) Professor Hicks
(C) Alfred Marshall (D) Paul Sweezy
3. Quasi rent is reward to a factor of production which is
(A) Economic rent in short run, but transfer earnings in long run
(B) Transfer earnings in short run
(C) Transfer earnings in both short run and long run
(D) Economic rent in both short run and long run
4. In short run, which of the following costs must continuously decrease as output increases
(A) Total variable cost (B) Total fixed cost
(C) Average fixed cost (D) Average variable cost
5. The output where diminishing returns to production begin is also the output where
(A) Marginal cost is at minimum (B) Average total cost is at minimum
(C) Average variable cost is at minimum (D) Marginal and average cost intersect
6. Who distinguished between value in use and value in exchange and gave the water-diamond paradox
(A) Adam Smith (B) David Ricardo
(C) Alfred Marshall (D) Karl Marx
7. If demand curve of a commodity is parallel to Y-axis, then its demand is
(A) Elastic (B) Perfectly inelastic
(C) Inelastic (D) Perfectly elastic
8. When the income elasticity of demand is less than unity, then the commodity is
(A) Luxury commodity (B) Necessary good
(C) Inferior good (D) Substitute good
9. An increase in demand can result from
(A) A reduction in price of substitutes (B) An increase in price of complements
(C) A increase in market price (D) An increase in income
10. Giffen goods are those goods
(A) Which are short in supply
(B) For which demand increases as price increases
(C) Which have a high-income elasticity of demand
(D) None of the above

11. Duopoly is the special case of which type of market structures?
 (A) Monopoly (B) Monopsony
 (C) Oligopoly (D) Imperfect Competition
12. Income effect of inferior goods is?
 (A) Negative (B) Positive (C) Zero (D) Can't say
13. The price elasticity of demand ranges between?
 (A) -1 to +1 (B) 0 to 1
 (C) -infinity to +infinity (D) 0 to infinity
14. The demand for factor of production is known as:
 (A) Cross demand (B) Joint demand
 (C) Independent demand (D) Derived demand
15. Income consumption curve for inferior commodity is:
 (A) Backward bending (B) Positively sloped
 (C) Negatively sloped (D) None of these
16. What is repo rate?
 (A) It is the rate at which RBI sells G-secs to banks
 (B) It is the rate at which RBI buys G-secs from banks
 (C) It is the rate at which RBI provides loans in market
 (D) None of the above
17. The Keynesian theory of money demand predicts that people will increase their money holdings if
 (A) Interest rates are about to fall (B) Bond prices are about to rise
 (C) Bond prices are about to fall (D) Expected inflation is about to fall
18. According to classical economists, which kind of unemployment will not exist in the economy?
 (A) voluntary unemployment (B) involuntary unemployment
 (C) frictional unemployment (D) cyclical unemployment
19. MPC plus MPS must always equal
 (A) APC (B) 1
 (C) Slope of the consumption function (D) Zero
20. If $MPS=0.5$, the multiplier would be
 (A) 2 (B) 4 (C) 0.2 (D) 6
21. Due to increase in investment by \$200, income increases by \$400. Multiplier is
 (A) 5 (B) 4 (C) 2 (D) 8
22. Which of the following is correct for Keynesian model?
 (A) It is supply determined (B) It ignores money market
 (C) It assumes full employment of resources (D) None of these
23. Transfer payments made by government are not included in domestic product because
 (A) These are gifts from government to recipients
 (B) They are not counted as commodities

- (C) No corresponding production of goods and services has taken place to match such payments
- (D) There may be leakages in such payments
24. If the level of national income is above equilibrium level of national income, then
- (A) Autonomous consumption will fall and economy will move towards equilibrium
- (B) Inventories will accumulate and production will fall, moving towards equilibrium
- (C) Intended investment is equal to saving
- (D) Consumption demand is greater than consumer goods produced
25. According to multiplier theory economy operates at
- (A) Full employment level (B) Over full employment level
- (C) Below full employment (D) None of these
26. Human Development Index was formulated by
- (A) World Bank (B) International Monetary Fund
- (C) UNTAD (D) UNDP
27. In economic development, the importance of externality was introduced by
- (A) Hirschman (B) JE Meade
- (C) Scitovsky (D) Ragnar Nurkse
28. In Hicks neutral technical progress, the technical progress is
- (A) Capital augmenting
- (B) Labour augmenting
- (C) Both labour and capital augmenting
- (D) Change in the efficiency and productivity of labour
29. Harrod-Domar model of economic growth is based on the equilibrium between
- (A) income generation and productive capacity reduction
- (B) equilibrium between income and consumption
- (C) equilibrium between saving and investment
- (D) none of the above
30. The unbalanced growth model was propounded first by
1. Albert O Hirschman
 2. HS Singer and Raul Prebisch
 3. Kindelberger and Ragnar Nurkse
 4. WW Rostov and Paul Streeten
- Select the correct answer using the codes given below
- (A) 1 and 2 only (B) 1 and 3 only
- (C) 1 and 4 only (D) Only 1
31. The 'Golden Age' model was developed by
- (A) Nicholas Kaldor (B) Joan Robinson
- (C) JR Hicks (D) RF Harrod
32. Marxian theory of evolution of economy is referred to as
- (A) Deduction (B) Dialectical materialism

- (C) Induction (D) None of these
33. The major difference between Harrod-Domar and Solow models of growth lies in
 (A) Returns to scale
 (B) Returns to variable factors
 (C) Substitutability between labour and capital
 (D) Growth of income
34. Financial dualism theory was developed by
 (A) M. Porter (B) H. Myint
 (C) A.M. Khan (D) Solow
35. According to W.W. Rostow, first stage of development is
 (A) Traditional society (B) Pre-traditional society
 (C) Take-off (D) High mass consumption stage
36. If $3A - B = \begin{bmatrix} 5 & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$, then find the matrix A
 (A) $\begin{bmatrix} 3 & 1 \\ 1 & 2 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}$
 (C) $\begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 3 & 3 \\ 2 & 1 \end{bmatrix}$
37. A competitive firm faces a price of 136 and a total cost function of $TC = 7q^2 + 6q + 5$.
 The marginal cost function of the firm is
 (A) $14q + 6$ (B) $10q + 7$
 (C) $5q + 2$ (D) $5q + 20$
38. Any difference equation of the general form $Y_t = Ab^t + c$ is said to converge if
 (A) $|b| < 1$ (B) $|b| > 1$
 (C) $b > 0$ (D) $b < 0$
39. If first term of a G.P. is 729 and its seventh term is 64, then sum of first seven terms is
 (A) 2080 (B) 2060 (C) 2059 (D) 2120
40. An optimization problem may involve finding
 (A) Maximum profit (B) Minimum cost
 (C) Minimum use of resources (D) All of these
41. Given the supply function $= (Q + 3)^2$, what would be producer surplus at $P_0 = 81$ and $Q_0 = 100$.
 (A) 130 (B) 242 (C) 252 (D) 142
42. Two matrices A and B are added if
 (A) number of rows of A is equal to number of columns of B
 (B) number of columns of A is equal to number of columns of B
 (C) both have the same order
 (D) both are rectangular
43. If $|A| = 0$, then A is
 (A) Zero matrix (B) Singular matrix
 (C) Non-singular matrix (D) 0
44. What is the degree of the differential equation

$$\frac{d^3y}{dx^3} + 2\left(\frac{d^2y}{dx^2}\right)^2 - \frac{dy}{dx} + y = 0?$$

(A) 6

(B) 3

(C) 2

(D) 1

45. A card is drawn randomly by player A from a deck of ordinary playing cards. The player wins if the card is a diamond or an ace. What is the probability that A will win the game?

(A) $\frac{6}{13}$

(B) $\frac{4}{52}$

(C) $\frac{13}{52}$

(D) $\frac{4}{13}$

46. If the variables are varying in opposite directions, it is called

(A) Positive correlation

(B) Negative correlation

(C) Linear correlation

(D) None of these

47. The coefficient value of correlation lies between

(A) 0 to 1

(B) 0 to -1

(C) -1 to +1

(D) 1 to 10

48. If the coefficient of determination is 1, the correlation coefficient

(A) Must be equal to 1

(B) Can be either -1 or +1

(C) Can be any value between -1 and +1

(D) Must be -1

49. The formula to calculate mode is given as:

(A) Mode = 3 Median + 2 Mean

(B) Mode = 3 Median - 3 Mean

(C) Mode = 2 Median - 3 Mean

(D) Mode = 3 Median - 2 Mean

50. In a positively skewed distribution, the value of

(A) Mean is maximum

(B) Mode is maximum

(C) Mean and Mode are same

(D) None of the above

51. Range limit can be expressed as

(A) $R = L + S$

(B) $R = L + S/2$

(C) $R = L - S$

(D) None of the above

52. If two events A and b are mutually inclusive, then $P(A \text{ or } B)$ is

(A) $P(A) + P(B) - P(AB)$

(B) $P(A) + P(B) + P(AB)$

(C) $P(A) + P(B)$

(D) $P(A) \times P(B)$

53. Three coins are tossed simultaneously. What is the probability that they will fall 2 heads and 1 tail?

(A) $\frac{1}{2}$

(B) $\frac{1}{4}$

(C) $\frac{3}{4}$

(D) $\frac{3}{8}$

54. Type I error is defined as

(A) Reject null hypothesis when it is false

(B) Reject null-hypothesis when it is true

(C) Accept null hypothesis when it is true

(D) Accept null hypothesis when it is false

55. $\text{Var}(X)=4$ and $\text{Var}(Y)=9$. If X and Y are independent random variables then $\text{Var}(2X+Y)$ is:

(A) 19 (B) 17 (C) 25 (D) 13

56. As per Budget 2023-24, the estimated level of fiscal deficit of India for the year 2023-24 would be

(A) 5.3 per cent (B) 4.9 per cent
(C) 6.3 per cent (D) 5.9 percent

57. Since budget year....., India has discontinued the classification of development and non-development expenditure.

(A) 2017-18 (B) 2018-19
(C) 2019-20 (D) 2020-21

58. An international theory of trade, 'Vent for Surplus' doctrine is associated with the name of

(A) David Ricardo (B) Adam Smith
(C) Alfred Marshall (D) J.M. Keynes

59. Capital Expenditure is generally corresponding to:

(A) Declining government liabilities (B) Rising government liabilities
(C) Sale of assets (D) None of these

60. Public goods are always:

(A) Non-rival and excludable (B) Rival and excludable
(C) Non-rival and non-excludable (D) Rival and non-excludable

61. According to Peacock-Wiseman Hypothesis, Government expenditure

(A) Increases in smooth pattern (B) Decrease over time
(C) Increases in step like pattern (D) Remains constant over time

62. Rahn Curve describes

(A) An optimum level of tax rate
(B) A relationship between inequality and level of development
(C) An optimum level of economic growth
(D) An optimum size of government's economic activity

63. In Gravity model of international trade, international trade between two nations depends upon:

(A) Size of two economies and distance between them.
(B) Size and their bilateral relations.
(C) Distance and their bilateral relations.
(D) Distance and factor endowments.

64. Rate of protection is said to be effective if:

(A) Rate of tariff remains equal on final goods and their inputs.
(B) Rate of tariff on inputs is greater than rate on final goods.
(C) Rate of tariff on final goods is greater than rate on inputs.
(D) Can't be determined.

65. India is not part of

(A) SAARC (B) ASEAN
(C) SAPTA (D) G20

66. According to Heckscher Ohlin theory of international, the leading force behind international trade among countries is
 (A) absolute advantage in cost of production
 (B) comparative advantage in cost of production
 (C) existing rate of economic growth
 (D) factor endowment
67. Dumping refers to:
 (A) selling goods at cheaper rate in home market
 (B) to act discriminately and charge higher price in foreign market
 (C) selling goods in foreign market at price lower than cost price of domestic suppliers
 (D) to ban import from foreign countries
68. When demand curve is more elastic than supply curve, burden of taxation
 (A) falls on seller and consumer equally
 (B) falls more on seller than consumer
 (C) falls more on consumer than seller
 (D) none of these
69. Which of the following is highest form of Economic integration?
 (A) Foreign Trade Area
 (B) Custom Union
 (C) Economic Union
 (D) Common market
70. 'Canons of public expenditure' is associated with the name of
 (A) Adam Smith
 (B) Findlay Shirras
 (C) H. Dalton
 (D) A.C. Pigou
71. The value of 1 in gini index represents
 (A) Complete equality
 (B) Complete inequality
 (C) Low inequality
 (D) Low equality
72. Second stage of demographic transition is characterised by?
 (A) High birth rate and low death rate
 (B) High birth rate and high death rate
 (C) Low birth rate and low death rate
 (D) Low birth rate and high death rate
73. India's 2nd five year plan was based on which model?
 (A) Nehru model
 (B) Harrod domar model
 (C) Mahalanobis model
 (D) Leontief model
74. Transfer payments is:
 (A) Payment for goods with money
 (B) Payment for goods with goods
 (C) Payment with no goods exchanged
 (D) None of these
75. Which of the following is not included in calculating the national income of a country?
 (A) Maid working for some family
 (B) Sale of a new car
 (C) An accountant working at an office
 (D) A housewife doing household chores

$x-x-x$

M.Com. (Master of Entrepreneurship and Family Business)

1. Which day is celebrated as World AIDS Day?
(A) 1st December (B) 10th January (C) 6th March (D) 19th April
2. Which company has developed the world's first pilotless, fighter-like jet prototype?
(A) Airbus (B) Boeing (C) Tesla (D) NSIL
3. The size, mass & density of which of the planets is very near to those of Earth?
(A) Mercury (B) Moon (C) Jupiter (D) Venus
4. Which among the following does not come under Fundamental Duties of a citizen in India?
(A) To protect and Improve Natural Environment
(B) To develop scientific temper, humanism and spirit of inquiry and reform
(C) To strive towards abolition of untouchability
(D) All come under fundamental duties
5. Which price index is being used to measure inflation by the Reserve Bank of India?
(A) Industrial cost and Price Index (B) GDP inflator
(C) Consumer Price Index (D) Purchasing power parity based index
6. Which of the following is not a classical dance of India?
(A) Kathak (B) Sattriya (C) Manipuri (D) Bhangra
7. Who is known as the father of geometry?
(A) Pythagoras (B) Euclid (C) Aristotle (D) Kepler
8. Who appoints the judges of the Supreme Court?
(A) Chief Justice of India (B) President
(C) Prime Minister (D) Council of Ministers
9. How many fundamental duties are set out in Part IV A (Article 51A) of the Constitution of India?
(A) 10 (B) 11 (C) 12 (D) 9
10. Gangotri national park is located in which state?
(A) Uttar Pradesh (B) Kerala (C) Haryana (D) Uttarakhand
11. The constitution of India was adopted by the constituent assembly on:
(A) 26th January 1950 (B) 26th November 1949
(C) 26th January 1949 (D) 15th August 1947
12. "Satmala Hills" are located in which among the following states?
(A) Tamil Nadu (B) Gujarat (C) Maharashtra (D) Rajasthan
13. In which city are the headquarters of International Monetary Fund?
(A) Washinton DC (B) New York (C) Berlin (D) London
14. Following country is not a member of SAARC
(A) Afghanistan (B) China (C) Bhutan (D) Maldives
15. APJ Abdul Kalam satellite launch vehicle mission 2023 was launched from which of the following states?
(A) Tamil Nadu (B) Kerala (C) Goa (D) Odisha

16. Which of the following was selected as the best web series in Dadasaheb Phalke international film festival awards 2023?

- (A) Dharavi Bank (B) Family Man
(C) Asur: Welcome to your Dark side (D) Rudra: The Edge of Darkness

17. The members of the Rajya Sabha are elected by

- (A) The people
(B) Lok Sabha
(C) Elected members of the legislative assembly
(D) Elected members of the legislative council

18. Which countries are claiming the islands in the Aegean Sea?

- (A) France and Spain (B) Greece and Turkey
(C) UAE and Israel (D) Russia and Ukraine

19. Which neighbouring country of India has been removed from FATF Grey List?

- (A) Sri Lanka (B) Pakistan (C) Nepal (D) Afghanistan

20. Match the following authors with their works:

A. Sashi Tharoor	P. The Suitable Boy
B. Salman Rushdie	Q. Sea of Poppies
C. Vikram Seth	R. Inglorious Empire
D. Arundathi Roy	S. Shalimar of the Clown
E. Amitav Gosh	T. The Ministry of Utmost Happiness

- (A) ABCDE-RSPTQ (B) ABCDE-PQRST
(C) ABCDE-TSPRQ (D) ABCDE-SRPTQ

21. Dog : Rabies :: Mosquito : ?

- (A) Plague (B) Death (C) Malaria (D) Sting

22. Fog : Visibility :: AIDS : ?

- (A) Health (B) Resistance (C) Virus (D) Death

Directions (23-27): Study the following information to answer the given questions. students Varun, Udit and Tarun are seated in a circle facing the centre. Akash, Bharti and Charu are also seated in the same circle but two of them are not facing the centre (facing opposite direction of the centre.) Varun is second to the left of Charu. Udit is second to the right of Akash. Bharti is third to the left of Tarun. Charu is second to the right of Tarun. Akash is seated next to Varun.

23. Which of the following is Varun's position with respect to Charu?

- (A) Second to the right (B) Third to the left
(C) Fourth to the right (D) Fourth to the left

24. Which of the following are not facing the centre?

- (A) Bharti-Akash (B) Charu-Akash

(C) Bharti-Charu (D) Cannot be determined

25. Which of the following is true regarding the seating arrangement?

- (A) Akash, Bharti and Charu are seated adjacent
(B) Varun, Udit and Tarun are seated adjacent
(C) There are two persons whose seating arrangement cannot be ascertained
(D) Those not facing the centre are seated adjacent

26. Which of the following is Tarun's Position with respect to Bharti?

- (A) Third to the right (B) Second to the right
(C) Third to the left (D) Third either to the right or to the left

27. Which of the following is Akash's position with respect to Udit?

- (A) Second to the left (B) Second to the right
(C) Third to the right (D) Cannot be determined

28. Butter : Milk :: Book : ?

- (A) Chapter (B) Printing (C) Paper (D) Author

29. Reading : Knowledge :: Work : ?

- (A) Experience (B) Experiment (C) Engagement (D) Employment

30. 4 : 6 :: _____ : 16

- (A) 2 (B) 14 (C) 8 (D) 10

31. Statements:

Some poor are honest.

Some honest are sharp.

Conclusions: I. Some poor being sharp or honest is a possibility.

II. At least some poor will be sharp.

(A) if only conclusion I follows

(B) if only conclusion II follows

(C) if either conclusion I or conclusion II follows

(D) if neither conclusion I nor conclusion II follow

32. Statement: "If you trouble me, I will slap you." - A mother warns her child.

Assumptions: With the warning, the child may stop troubling her.

All children are basically naughty.

(A) Only assumption I is implicit

(B) Only assumption II is implicit

(C) Either I or II is implicit

(D) Neither I nor II is implicit

33. WINDOW:CURTAIN::

(A) Door : Frame

(B) Book : Jacket

(C) CPU : Cabinet

(D) Casing : Wire

34. FOX : CUNNING :: RABBIT : ?

(A) Courageous

(B) Dangerous

(C) Timid

(D) Ferocious

35. FLEXIBLE : RIGID :: CONFIDENCE : ?

(A) Diffidence

(B) Indifference

(C) Cowardice

(D) Scare

36. NECKLACE : ADORNMENT :: ?

(A) Medal : Decoration

(B) Bronze : Medal

(C) Scarf : Dress

(D) Window : House

37. BILLY : GOAT ::

- (A) Cow : Bull (B) Lord : Maid (C) Man : Woman (D) Cow : Calf

38. WORK : MOTIVE ::

- (A) Body : Mind (B) Wall : Paint (C) Body : Food (D) Petrol : Car

39. What would come next in the following series of numbers?

1, 2, 10, 37, _

- (A) 62 (B) 91 (C) 101 (D) None of these

40. 12, 24, 36, 48, ?, 72

- (A) 50 (B) 55 (C) 60 (D) 70

41. Find out the wrong number in the series

28, 84, 112, 196, 308, 504, 872

- (A) 112 (B) 196 (C) 308 (D) 872

42. Look at this series: 36, 34, 30, 28, 24, ... What number should come next?

- (A) 20 (B) 22 (C) 23 (D) 26

Directions (Questions 43-46): The following table gives the percentage distribution of the population of five states, P, Q, R, S and T on the basis of the poverty line and also on the basis of sex. Study the table and answer the questions based on it.

State	Percentage of Population below Poverty Line	Proportion of Males and Females	
		Below Poverty Line M : F	Above Poverty Line M : F
P	35	5 : 6	6 : 7
Q	25	8 : 5	4 : 5
R	24	1 : 2	2 : 3
S	19	3 : 2	4 : 3
T	15	5 : 3	3 : 2

43. What will be the number of females above the poverty line in the State S if it is known that the population of State S is 7 million?

- (A) 3 million (B) 2.43 million (C) 1.33 million (D) 1.61 million

44. If the male population above the poverty line for State R is 1.9 million, then the total population of State R is:

- (A) 4.5 million (B) 4.85 million (C) 5.35 million (D) 6.25 million

45. What will be the male population above the poverty line for State P if the female population below the poverty line for State P is 2.1 million?

- (A) 2.1 million (B) 2.3 million (C) 3.3 million (D) 3.4 million

46. If the population of males below the poverty line for State Q is 2.4 million and that for State T is 6 million, then the total populations of states Q and T are in the ratio:

- (A) 1 : 3 (B) 2 : 5 (C) 3 : 7 (D) 4 : 9

47. Choose the word which is different from the rest.

- (A) Curd (B) Butter (C) Oil (D) Cheese

48. Choose the word which is different from the rest.

- (A) Rigveda (B) Yajurveda (C) Atharvaveda (D) Ayurveda

49. Choose the word which is different from the rest.

- (A) Kiwi (B) Eagle (C) Emu (D) Ostrich

Directions For questions 50 to 52: the financial profile of a company is as given below:

Rs. Million	Year ended 31 st Mar 2001	Year ended 31 st Mar 2000
Gross Revenue	187.1	147.8
Gross Profit	10.8	3.9
Profit after Tax	8.8	3.1
Equity Capital	7.5	7.5
Reserves	18.4	20.0
EPS	117.33	41.33
Net Margin%	4.65	1.82

50. What is the % growth shown of total revenue in 2001 over 2000? (Figures shown in parenthesis represent negative growth)

- (A) 18% (B) 27% (C) 22% (D) 10%

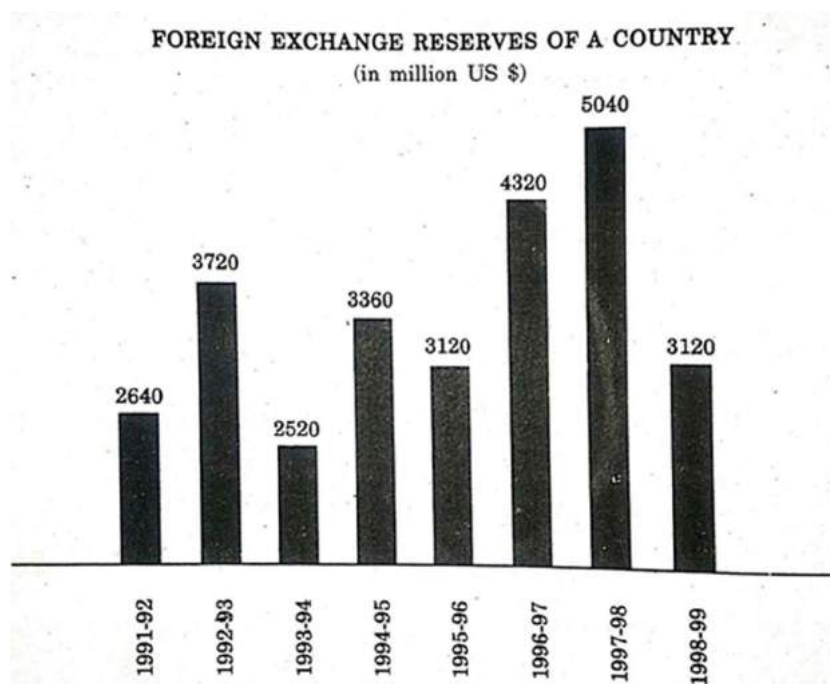
51. The net margin in 2001 has shown an increase over 2000 of (Net margin is % of Gross revenue)

- (A) 3 m (B) 6 m (C) 0.6 m (D) 1.2 m

52. What is the face value per share? (No. of shares = (Net profit/EPS), Face value = Equity/No. of shares)

- (A) Rs. 10 (B) Rs. 100 (C) Rs. 1000 (D) Can't say

Direction (53-57): The bar graph given shows the foreign exchange reserves of a country (in million US \$) from 1991-92 to 1998-99. Answer the question based on this graph.



53. The foreign exchange reserves in 1997-98 was how many times that in 1994-95?

- (A) 0.7 (B) 1.2 (C) 1.4 (D) 1.5

54. What was the percentage increase in the foreign exchange reserves in 1997-98 over 1993-94?
 (A) 100 (B) 150 (C) 200 (D) 620
55. For which year, the percentage increase of foreign exchange reserves over the previous year, is the highest?
 (A) 1992-93 (B) 1993-94 (C) 1994-95 (D) 1996-97
56. The foreign exchange reserves in 1996-97 were approximately what percent of the average foreign exchange reserves over the period under review?
 (A) 95% (B) 110% (C) 115% (D) 125%
57. The ratio of the number of years, in which the foreign exchange reserves are above the average reserves, to those in which the reserves are below the average reserves, is:
 (A) 2 : 6 (B) 3 : 4 (C) 3 : 5 (D) 4 : 4
58. NABARD is associated with the development of
 (A) The agriculture sector and rural areas (B) Heavy Industries
 (C) Banking Sector (D) Real estates
59. The permission given to a bank customer to draw cheques in excess of his current account balance is called
 (A) A personal loan (B) An ordinary Loan
 (C) Discounting a bill of exchange (D) An overdraft
60. Bank rate refers to the interest rate at which
 (A) Commercial bank receives deposits from the public
 (B) Central bank gives loans to commercial banks
 (C) Government loans are floated
 (D) Commercial bank grants loans to their customers
61. CVP analysis is most important for the determination of
 (A) sales revenue necessary to equal fixed costs
 (B) relationship between revenues and costs at various levels of operations
 (C) variable revenues necessary to equal fixed costs
 (D) volume of operations necessary to Break-even
62. The ratios which reflect managerial efficiency in handling the assets is
 (A) turnover ratios (B) profitability ratios
 (C) short term solvency ratio (D) none of these
63. Guarantee to an exporter that the importer of his goods will pay immediately for the goods ordered by him, is known as:
 (A) Letter of credit (L/C) (B) Inflation
 (C) Laissez-faire (D) None of these
64. In funds flow statement, funds from operations is
 (A) application of fund (B) source of cash
 (C) application of cash (D) source of fund
65. Capital formation in an economy depends on
 (A) Total income (B) Total demand
 (C) Total savings (D) Total production

66. 'Golden Handshake Scheme' is associated with
 (A) Inviting Foreign Companies (B) Private investment in public enterprises
 (C) Establishing joint enterprises (D) Voluntary retirement
67. When a large number of investors in a country transfers investments elsewhere because of disturbed economic conditions, it is called
 (A) Transfer of Capital (B) Escape of Capital
 (C) Outflow of Capital (D) Flight of Capital
68. A good Brand can be built up by way of
 (A) Customer grievances (B) Break down of IT support
 (C) Old age (D) Consistent offering of good services
69. Which pair is not correct?
 (A) EXIM Bank- Financing for export-import
 (B) RBI- Banker's bank
 (C) IDBI- industrial finance
 (D) FCI- financial assistance to commercial institutions
70. Match the brand or product name with their company slogans
 a. You're in good hands i. Toyota
 b. Think Big ii. Ford
 c. Let's go places iii. Allstate
 d. Belong Anywhere iv. IMAX
 e. Go Further v. Airbnb
 (A) a-i; b-v; c-ii; d-iv; e-iii (B) a-iii; b-iv; c-i; d-v; e-ii
 (C) a-iv; b-v; c-ii; d-iii; e-i (D) a-ii; b-iv; c-i; d-iii; e-v
71. What is the term used in economics for the slightest movement in the price of a commodity in financial market place.
 (A) Utility (B) Tick (C) Penny (D) Liquidity
72. The phrase used by Adam Smith to define an economy's ability to correct itself is?
 (A) 'Self controlling prophecy' (B) 'The Invisible Hand'
 (C) 'Circle of Economy' (D) 'Hand of God'
73. Which of the following taxes is not collected by the Central Government?
 (A) Income Tax (B) Customs duty (C) Professional Tax (D) Excise Duty
74. A scheduled commercial bank is registered with
 (A) SEBI (B) RBI (C) IRDA (D) Finance ministry
75. When a company takes over another one by obtaining a controlling interest in another company it is called
 (A) Acquisition (B) Merger (C) Strategic Alliance (D) None of these

x-x-x

M.Com.(Honours)

1. Balance sheets are prepared
(A) Annually (B) Daily (C) Monthly (D) Weekly
2. Auditing refers to
(A) Reporting the financial information (B) Examination of financial information
(C) Maintaining the ledger accounts (D) Preparation of financial statements
3. Current ratio =
(A) Current assets/Current liabilities (B) Debt/Equity
(C) Quick assets/Current liabilities (D) Current assets/Equity
4. In accounting, an economic event is referred to as
(A) Transaction (B) Bank statement (C) Cash (D) Exchange of money
5. Any written evidence in support of a business transaction is
(A) Journal (B) Ledger (C) Ledger posting (D) Voucher
6. The Unfavorable balance of profit and loss account should be
(A) Added to liabilities (B) Subtracted from current assets
(C) Subtracted from capital (D) Subtracted from liabilities
7. Commercial accounting is based on
(A) Single entry book keeping
(B) Double entry book keeping
(C) Both single and double entry book keeping
(D) Cash basis of book keeping
8. The main Purpose of Financial Accounting is?
(A) To Provide financial information to shareholders
(B) To maintain balance sheet
(C) To minimize taxes
(D) To keep track of liabilities
9. The account which increases equity is known as?
(A) Debit account (B) Credit account (C) Revenue (D) Treasury stock
10. The Practice of Management written by
(A) Peter F. Drucker (B) Terry
(C) Louis Allan (D) Henry Fayol
11. Study of the movements of both the workers and the machine to eliminate wasteful movement is
(A) Fatigue study (B) Time study (C) Motion study (D) Work-study
12. The first and foremost function of management is
(A) Planning (B) Organizing (C) Controlling (D) Coordination
13. Which among the following does not come under Land Resources?
(A) Fertility of Land (B) Location of Land
(C) Composition of Land (D) All of the above are land resources

14. Per Capita Income of a country is obtained by dividing National Income by which of the following?
 (A) Total working population (B) Total population of the country
 (C) Area of the country (D) Volume of the capital used
15. Which of the following is represented by 'Lorenz Curve'?
 (A) Inflation (B) Income Distribution
 (C) Employment (D) Deflation
16. The primary task of the Operation Manager is one of the?
 (A) Controlling (B) Management
 (C) Wealth creator (D) Risk Management
17. OCF stands for?
 (A) Operating control flow (B) On-going cash flow
 (C) Operating cash flow (D) On-line cash flow
18. The point where the total cost equals the total Revenue is called the?
 (A) Saturation point (B) The maximum point of level
 (C) The minimum point of level (D) Break-even-point
19. TPM stands for?
 (A) Total productive Maintenance (B) Team Productive maintenance
 (C) Team Periodic maintenance (D) Team productive management
20. A branch set up merely for booking orders which are executed by head office is?
 (A) Dependent branch (B) Independent branch
 (C) Foreign branch (D) Local branch
21. East India Company is an example of
 (A) Chartered Companies (B) Statutory Companies
 (C) Registered Companies (D) OPC
22. ESOP stands for?
 (A) Employees Share Option Plan (B) Employees Stock Option Process
 (C) Employees Stock Option Plan (D) Employees Share Owner Plan
23. The National Development Council gets its administrative support from?
 (A) Planning Commission (B) Finance Commission
 (C) Administrative Reforms Commission (D) Sarkaria Commission
24. What does the term "Incentive" mean?
 (A) It is the opposite of a trade-off
 (B) It could be a reward but could not be a penalty
 (C) It could either be a reward or a penalty
 (D) It could be a penalty but could not be a reward
25. Macroeconomic issues include?
 (A) The impact of government regulation on markets

- (B) Total employment nationwide
(C) Studying what factors affect the price and quantity of automobiles
(D) Studying the regulation of wages and production costs in the software industry
26. What does RBC stand for?
(A) Random Business Cycle (B) Rational Business Cycle
(C) Revolutionary Business Cycle (D) Real Business Cycle
27. Name the organization which publishes the Consumer Confidence Index
(A) SEBI (B) NABARD
(C) State Bank of India (D) RBI
28. In order to control credit, Reserve Bank of India should:
(A) Increase CRR and decrease Bank rate (B) Decrease CRR and reduce Bank rate
(C) Increase CRR and increase Bank rate (D) Reduce CRR and increase Bank rate
29. Monetary policy is implemented by in India.
(A) The Ministry of Finance (B) Planning Commission
(C) The Parliament (D) Reserve Bank of India
30. Which among the following is a characteristic of underdevelopment?
(A) Vicious circle of poverty (B) Rising mass consumption
(C) Growth of industries (D) High rate of urbanization
31. Keynes believed that the equality between savings and investment is brought about by:
(A) Rate of interest (B) Changes in income
(C) Availability of capital (D) Marginal efficiency of investment
32. Which of the following is known as long run average cost curve?
(A) Learning curve (B) Envelope curve
(C) Equal product curve (D) Phillips curve
33. Which of the following is related to green revolution in India?
(A) Environment Protection (B) High Yielding Variety of Seeds
(C) Green House Effect (D) Calculation of Green GNP
34. When was the AGMARK Act implemented in India?
(A) 1937 (B) 1952 (C) 1947 (D) 1965
35. On what basis does the monopolist resort to price discrimination?
(A) elasticity of supply (B) elasticity of demand
(C) law of demand (D) law of supply
36. The supply of labour in the economy depends on
(A) Population (B) National Income
(C) Per capita income (D) Natural resources
37. Contribution of agriculture to Gross National Product is approximately?
(A) 14% (B) 15% (C) 16.5% (D) 17.5%
38. The increase in oil seeds production was due to?
(A) White revolution (B) Yellow revolution (C) Green revolution (D) Brown revolution
39. Which state is the biggest tea producer in the country?
(A) Andhra Pradesh (B) Sikkim (C) Assam (D) West Bengal

40. Which among the following is a qualitative tool of monetary policy?
 (A) Bank Rate (B) Credit Ceiling (C) Credit rationing (D) Cash Reserve Ratio
41. Which of the following law is also known as Fundamental law of the land?
 (A) Constitutional Law (B) Criminal Law
 (C) Civil Law (D) Consumer law
42. The judgment delivered by higher courts is binding on lower courts. Technically it's known as
 (A) Judgment (B) Order (C) Command (D) Judicial Precedent
43. Which of the following is not a specific ground for divorce under the Hindu Marriage Act, 1955?
 (A) Adultery (B) Cruelty (C) Leprosy (D) Illiteracy
44. When consideration is illegal such agreement is?
 (A) Proper (B) Void (C) Improper (D) Voidable
45. Legal contract should be?
 (A) Illegal (B) Written (C) Implied (D) Party implied
46. Bilateral mistake and one-sided mistake are said to be mistake of?
 (A) Factual (B) Illegal (C) Personal (D) Legal
47. _____ is known as “the father of scientific management.”
 (A) Fredrick W. Taylor (B) Henry Fayol
 (C) Robert Owen (D) Juran
48. Which of the following is true about Principles of Management?
 (A) The principles of management are in a continuous process of evolution
 (B) The principles of management have evolved
 (C) The principles of management have not evolved
 (D) The principles of management are for employees
49. Which of the following is true about managers within an organisation?
 (A) Management skills apply to managers at top levels in an organisation
 (B) Management skills apply to managers at all levels in an organisation
 (C) Management skills apply to managers at middle levels in an organisation
 (D) Management skills apply to managers at executive levels in an organisation
50. Which of the following is the main reason for the existence of an organisation?
 (A) The vision of an organisation
 (B) The mission of an organisation
 (C) The objectives of an organisation
 (D) The Chief Executive Officer (CEO) of an organisation
51. **Planning is about deciding in advance what should be done.**
 (A) organising (B) directing (C) planning (D) controlling
52. The problem-solving process begins with

- (A) clarification of the situation (B) establishment of alternatives
- (C) identification of the difficulty (D) isolation of the cause

53. Who published the book 'The Psychology of Management'?
- (A) Henry Fayol (B) Robert Owen (C) F.W. Taylor (D) Willian Gilbert
54. _____ represents the lower level management covering execution and implementation functions.
- (A) Administrative Management (B) Operative management
- (C) Floor level management (D) Middle management
55. Which of the following describes the principle of harmony, not discord?
- (A) The management should properly investigate any task
- (B) The management should engage in scientific enquiry
- (C) The management should focus on observation and analysis
- (D) The management should share the gains or profits of a company with their workers
56. Which one is the true example of primary data from the following options?
- (A) Journal (B) Book (C) Census Report (D) Newspaper
57. Information of research is called _____
- (A) Qualitative (B) Quantitative (C) A and B both (D) Hypothetical
58. Pantry audits are gathered for recording –
- (A) Measure the wastage of goods
- (B) Measure the annual sale of good
- (C) Measure the different consumption of goods by the customers
- (D) Measure the average collection from the sale of the goods
59. Which of the following is an example of a financial risk?
- (A) Legal risk (B) Market risk (C) Reputational risk (D) Environmental risk
60. Among the below components, which one is not a part of specific forces of business.
- (A) Customers (B) Technological conditions
- (C) Employees (D) Investors
61. What is the most important factor of planning in business?
- (A) Working on the strategies reduces the chances of uncertainties.
- (B) Research the various alternatives for achieving a particular task with less investment.
- (C) Development of leadership quality among the employees
- (D) Selection of the most suitable plan for the business
62. From the options given below, which one is the single-used plan?
- (A) Rule (B) Strategy (C) Method (D) Budget
63. From the options below, decision-making is the part of which one?
- (A) Staffing (B) Planning (C) Directing (D) Organizing
64. A leader exercises his power over his followers because of his position held in the Organizational hierarchy is ____.

- (A) autocratic leader
- (B) intellectual leader
- (C) liberal leader
- (D) institutional leader

65. A leader motivates his followers to work hard by offering them rewards is ____.

- (A) positive style
- (B) negative style
- (C) autocratic style
- (D) democratic style

66. Control exercised while the activity is in progress is_____.

- (A) concurrent control
- (B) feedforward control
- (C) feedback control
- (D) preserving control

67. The person who sends a message is known as_____.

- (A) Sender
- (B) Receiver
- (C) Messenger
- (D) Communicator

68. The act of making ones ideas and opinions known to others is said by_____.

- (A) Meyer
- (B) Brown
- (C) Newman
- (D) Keith Davis

69. Communication that flow from superior to subordinates is_____.

- (A) downward communication
- (B) upward communication
- (C) horizontal communication
- (D) informal communication

70. Letters, circulars, memos, bulletin, manuals, reports are example of_____.

- (A) oral communication
- (B) written communication
- (C) gestural communication
- (D) sideward communication

71. Scalar chain means _____.

- (A) hierarchy levels
- (B) chain of command
- (C) delegation of authority
- (D) span of control

72. Gang plank is related to

- (A) communication
- (B) motivation
- (C) supervision of workers
- (D) incentives to workers

73. _____ is known as the founder of Human Relation School.

- (A) Henry Fayol
- (B) Elton Mayo
- (C) Peter Drucker
- (D) F.W. Taylor

74. A decision which is taken to meet unexpected situation_____.

- (A) problem decision
- (B) certainty decisions
- (C) crisis decision
- (D) organizational decision

75. Elements of delegation_____.

- (A) responsibility, authority, accountability
- (B) authority, delegation, accountability
- (C) responsibility, decentralization, centralization
- (D) controlling, responsibility, authority

76. ____ deals with appointing people and placing them at the appropriate jobs.

- (A) Human resources
- (B) Recruitment
- (C) Staffing
- (D) Placement

77. What is the study of how people allocate scarce resources among alternative uses called?

- (A) Microeconomics (B) Macroeconomics
(C) Fiscal policy (D) Monetary policy

78. What is the term used to describe the total value of all goods and services produced within a country's borders in a specific period?

- (A) Gross Domestic Product (GDP) (B) Gross National Product (GNP)
(C) Consumer Price Index (CPI) (D) Inflation rate

79. Which of the following is not a factor of production?

- (A) Land (B) Labor (C) Capital (D) Money

80. Which of the following best describes a market economy?

- (A) The government controls the means of production and distribution
(B) Prices and output are determined by supply and demand
(C) Consumers have little choice in the goods and services they purchase
(D) The economy is planned and organized by the central government

81. What is the term used to describe the difference between a country's exports and imports of goods and services?

- (A) Gross Domestic Product (GDP) (B) Balance of payments
(C) Inflation rate (D) Exchange rate

82. Which of the following is a benefit of effective communication in an organization?

- (A) Reduced employee turnover (B) Increased operational costs
(C) Decreased productivity (D) Increased customer complaints

83. What is the purpose of SWOT analysis?

- (A) To identify the strengths and weaknesses of the organization
(B) To identify the external opportunities and threats faced by the organization
(C) To determine the pricing strategy for a product
(D) To forecast the sales of a product

84. Which of the following is an example of a financial management function?

- (A) Recruitment and selection of employees
(B) Developing marketing strategies
(C) Budgeting and forecasting
(D) Research and development of new products

85. Which of the following is not a type of leadership style?

- (A) Autocratic (B) Democratic (C) Laissez-faire (D) Hierarchical

x-x-x

M.Com.(Business Innovation)

- 1) Which city hosted the G20 Foreign ministers meeting on March 1-2, 2023?
(A) Bhopal (B) Chandigarh (C) Shillong (D) New Delhi
- 2) The banks sanctions loans for purchase of washing machines, air-conditioners, refrigerators etc. Such goods are known as:
(A) White Goods (B) Brown Goods
(C) Green Goods (D) Blue Goods
- 3) _____ has become the first State in the Country to use robotic technology to clean all its operational manholes in the entire State:
(A) Odisha (B) Kerala (C) Sikkim (D) Uttarakhand
- 4) Social media giant Meta released its own version of chatGPT by the name of _____ on February 24, 2023:
(A) MetaChat (B) M-GPT
(C) LLaMA (D) LAMACHat
- 5) The headquarters of World Trade Organization (WTO) are situated at _____
(A) Rome (B) Geneva (C) New York (D) Brussels
- 6) What is the theme of 8th International Day of Yoga?
(A) Yoga for Heart (B) Yoga for Harmony and Peace
(C) Yoga for Health (D) Yoga for Humanity
- 7) Which Indian documentary film received an Oscar nomination in 2022?
(A) Writing with Fire (B) Forever Young
(C) Minding the Gap (D) The take
- 8) Which bank completed acquisition of Citibank's retail business in India on March 1, 2023?
(A) HDFC Bank (B) PNB
(C) Axis Bank (D) ICICI Bank
- 9) PEN/Nabokov Award-2023 is a lifetime achievement award given in the field of _____
(A) Journalism (B) Education (C) Mathematics (D) Literature
- 10) Government of India, for the first time nationalized 14 large commercial banks in which year?
(A) 1956 (B) 1969 (C) 1959 (D) 1971
- 11) Which city in Karnataka secured a place in the Guinness Book of World Records for having the longest railway platform in the World?
(A) Hubballi (B) Ballari (C) Dharwad (D) Mangaluru
- 12) International Day of Mathematics on March 14 also commemorates the birthday of which great mathematician?
(A) Isaac Newton (B) Albert Einstein
(C) Pythagorus (D) Archimedes
- 13) Money market in India is regulated by which of the following organization?
(A) Securities and Exchange Board of India
(B) Ministry of Finance
(C) Reserve Bank of India
(D) Money Market Regulatory Authority

- 14) Which of the following viruses was assessed to be responsible for highly infectious disease of small pox?
 (A) Adenovirus (B) Aichi Virus
 (C) Variola Virus (D) Cocksackie Virus
- 15) In which of the following countries, Prime Minister Narendra Modi gave a call "Bharat Chalo, Bharat se Judo"?
 (A) Russia (B) Australia (C) Japan (D) U.S.A
- 16) Which of the following is NOT included in the category of 'Intangible Assets'?
 (A) Patents Rights (B) Copyrights
 (C) Competitive benefit and privileges (D) Machinery
- 17) According to the money measurement concept, which of the following will be recorded in the books of accounts?
 (A) General health condition of the chairman of the company
 (B) Sales policy pursued by the enterprise
 (C) Quality of products of the enterprise
 (D) Purchase of machinery for ₹ 5,00,000
- 18) Which of the following is NOT included in Current Assets?
 (A) Cash in hand (B) Bank balance
 (C) Debtors (D) Building
- 19) Concept of realization implies accounting should be done
 (A) When cash is received from debtors
 (B) When order is received
 (C) When goods are delivered to customer
 (D) When advance for order is received
- 20) Which of the following branches of accounting primarily deals with processing and presenting of accounting data for internal use?
 (A) Financial accounting (B) Tax accounting
 (C) Management accounting (D) Inflation accounting
- 21) Computers of a firm are classified as
 (A) Fixed assets (B) Current assets
 (C) Liquid assets (D) Techno assets
- 22) The loss on sale of old motor car is debited to
 (A) Profit and Loss Account (B) Motor car account
 (C) Depreciation account (D) Cash account
- 23) Income tax paid by a sole trader is shown
 (A) On the debit side of the Trading account
 (B) On the debit side of Profit and Loss account
 (C) By way of deduction from the capital in the balance sheet
 (D) On the credit side of Profit and Loss Account
- 24) In the period of inflation, which of the following Inventory methods would be considered suitable by the accountant?
 (A) LIFO (B) FIFO
 (C) Average Cost (D) Standard Cost

- 25) On the admission of a new partner, the balance of the profit and loss adjustment account should be transferred to the capital account of :
 (A) All the partners in their new profit-sharing ratio
 (B) Old partners in their old profit-sharing ratio
 (C) Old partners in their new profit-sharing ratio
 (D) Old partners in their sacrificing ratio
- 26) After the reissue of forfeited shares
 (A) General reserve is debited with the credit balance left in the share forfeited account
 (B) General reserve is credited with the credit balance left in the share forfeited account
 (C) Capital reserve is debited with the credit balance left in the share forfeited account
 (D) Capital reserve is credited with the credit balance left in the share forfeited account
- 27) Both assets and owner's equity (capital) would be increased by :
 (A) Proprietor's withdrawals (B) Sale of goods on credit
 (C) Purchasing a machinery on credit (D) Retained earnings
- 28) Purchase of office furniture worth ₹ 2500 if debited to general expense account is the ____
 (A) error of omission (B) clerical error
 (C) error of principle (D) compensating error
- 29) Which of the following is not a disadvantage of sole proprietorship?
 (A) Limited managerial skills (B) Unlimited liability
 (C) Limited opportunities (D) Minimum Government regulations
- 30) A and B jointly purchased a tea shop. Each of them contributed a half of the expense incurred for the purchase of pottery and utensils. They then leased out the shop and shared the rent equally. The relation between A and B is that of
 (A) Co-owners (B) Partners
 (C) Joint venture (D) Coparceners
- 31) Who among the following is NOT a speculator in Stock exchange?
 (A) Broker (B) Bull (C) Bear (D) Stag
- 32) The Phrase *esprit de corps* means
 (A) Spirit of loyalty and pride (B) Spirit to rule the world
 (C) Spirit to strive for excellence (D) Spirit to divide and rule
- 33) The basis of Theory X is the reliance on
 (A) External control of human behavior
 (B) Self-control and self-direction
 (C) The belief the productivity is linked to trust, openness and intimacy in the work environment
 (D) Governmental regulatory framework
- 34) The process of grouping activities into units for the purpose of administration may be referred to as :
 (A) Departmentalization (B) Decentralization
 (C) Coordination (D) Specialization
- 35) The famous book 'The Practice of Management' was written by
 (A) F.W. Taylor (B) Peter F. Drucker
 (C) Henri Fayol (D) George R. Terry

- 36) A boy purchased a book of Harry Potter. He reads 22 pages of this book in 5 minutes. How many pages can he read in one week?
(A) 40000 (B) 44352 (C) 45550 (D) 37642
- 37) The ratio of present ages of a boy and his mother is 5:17. The ratio of the age of boy before 2 years and age of mother before 4 years is 1:3. Find the age of boy after 3 years.
(A) 10 years (B) 12 years (C) 15 years (D) 16 years
- 38) In a sports club, there are 250 students. 120 of them play Cricket, 80 play Lawn tennis and 90 play basketball. 50 students play both Cricket and Lawn Tennis, 60 students play Lawn Tennis and Basketball and 65 students play Cricket and Basketball. What is the minimum number of students who play at least one of these games?
(A) 115 (B) 150 (C) 165 (D) 135
- 39) A student got twice as many sums wrong as he got right. If he attempted 48 sums in all, how many did he solve correctly?
(A) 12 (B) 16 (C) 18 (D) 24
- 40) If every 2 out of 3 readymade shirts need alterations in the sleeves, and every 4 out of 5 need it in the body, how many alterations will be required for 60 shirts?
(A) 24 (B) 123 (C) 133 (D) 143
- 41) In three coloured boxes-Red, Green, and Blue, 108 balls are placed. There are twice as many balls in the green and red boxes combined as there in the blue box and twice as many in the blue box as there in the red box. How many balls are there in the green box?
(A) 18 (B) 36 (C) 45 (D) 54
- 42) A cone, a cylinder and a hemisphere stand on the same base. Find the ratio of their volume. They have equal heights.
(A) 1:2:3 (B) 1:3:2 (C) 2:3:1 (D) 3:2:1
- 43) X and Y sold their articles at ₹ 1818, but X incurred a loss of 10% while Y got the profit of 1%. What is the ratio of the cost price of their articles?
(A) 10:9 (B) 101:90 (C) 100:97 (D) 9:8
- 44) A woman says, "If you reverse my own age, the figures represent my husband's age. He is, of course, senior to me and the difference between our ages is one-eleventh of their sum". The woman's age is
(A) 23 years (B) 34 years (C) 45 years (D) 52 years
- 45) A man was assigned to find the average age of a class of 15 students. By mistake he included the 50-year-old teacher as well and hence the average went up by 3 years. Find the actual average age of the class.
(A) 5 years (B) 7 years (C) 2 years (D) 3 years
- 46) The length and the breadth of a rectangular plot are in the ratio of 7:5. If the cost of fencing the plot @ 25 per metre is ₹ 4800, what is the area of the plot in sq metre?
(A) 2240 (B) 2142 (C) 2269 (D) 2025
- 47) How many kg of salt at 40 paise per kg must a man mix with 20 kg of salt at 22 paise per kg so that he may, on selling the mixture at 36 paise per kg, gain 20% on the outlay?
(A) 14 kg (B) 18 kg (C) 16 kg (D) 17 kg

- 48) Solve: $23.002 \times 43.952 - 353.020 =$
 (A) 559 (B) 473 (C) 659 (D) 359
- 49) The sum of the ages of three children, each born at an interval of 5 years, is 45 years. What is the sum of the ages of the youngest and the oldest child?
 (A) 30 years (B) 28 years (C) 40 years (D) 35 years
- 50) The compound interest earned on a sum in 2 years at 20% per annum is ₹ 5060. What is the sum?
 (A) ₹ 12100 (B) ₹ 10720 (C) ₹ 11500 (D) ₹ 13215
- 51) The ratio of the speed of two cars A and B is 5:9. If A takes 240 minutes more than B to cover a certain distance, then find the actual time taken by B to cover the same distance.
 (A) 6.5 hours (B) 7.2 hours (C) 3 hours (D) 5 hours
- 52) Two pipes P and Q can fill a cistern in 40 minutes and 60 minutes respectively. There is a third pipe in the bottom of the cistern to empty it. If all three pipes are opened simultaneously, then the cistern is full in 30 minutes. In how much time can the third pipe empty the cistern?
 (A) 100 minutes (B) 120 minutes (C) 115 minutes (D) 110 minutes
- 53) A boat running downstream covers a distance of 20 km in 2 hours. While coming back the boat takes 4 hours to cover the same distance. If the speed of the current is one-third that of the boat, then what is the speed of the boat?
 (A) 6.7 kmph (B) 7.5 kmph (C) 7.1 kmph (D) 7.9 kmph
- 54) There are four consecutive positive odd numbers and four consecutive positive even numbers. The sum of the highest even number and the highest odd number is 37. What is the sum of all the four consecutive odd and even numbers?
 (A) 104 (B) 124 (C) 126 (D) 132
- 55) The population of a village is 14641. During the last two years, the population increased at the rate of 10% per year. the population two years ago was _____
 (A) 12205 (B) 11995 (C) 12100 (D) 11875

Directions (Q 56-60): Study the following information carefully and answer the questions given below:

Seven family members J, K, L, M, N, O and P are sitting in a row facing North but not necessarily in the same order. There are two married couples in the family. N is not a brother-in-law of M. K sits on the immediate right of his grandfather. J sits on the immediate right of his niece. P is the grandfather of K. The nephew of J sits second to the right of his mother. J is unmarried and his mother is P. M sits third to the left of the one who is the mother of brother-in-law of M. L is the sister of K and only one of them sits at either of the extreme ends of the row. Only two persons sit between K and the husband of M. O has only two sons.

- 56) How is the daughter of N related to mother-in-law of M
 (A) Daughter (B) Grandson (C) Granddaughter (D) Son
- 57) Who among the following sits on the immediate left of the one who is grandmother of L?
 (A) K (B) M (C) N (D) J

- 58) Which of the following statements is True?
 (A) O and P are immediate neighbors of each other
 (B) L is the grandson of O
 (C) N and the wife of N are immediate neighbors of each other
 (D) Only two persons sit on the left of J's sister-in-law
- 59) What is the position of J with respect to his father?
 (A) Third to the right (B) Third to the left
 (C) Second to the left (D) Second to the right
- 60) How many persons sit between N and his son?
 (A) One (B) Two (C) Three (D) Four
- 61) If all the digits in 8753261 are arranged in descending order from left to right, the positions of how many digits will remain unchanged?
 (A) One (B) Two (C) Three (D) Four
- 62) In a certain code language, 'she is coming' is coded as '516', 'he also coming' is coded as '642' and 'yes he is' is coded as '543'. What will be code for 'also' in the given code language?
 (A) 5 (B) 6 (C) 2 (D) 4
- 63) In a certain code language, 'THRIVE' is coded as 'RJPKTG' and 'BRIGHT' is coded as 'ZTGIFV'. In the same code language, how will 'ABSENT' be coded?
 (A) YDRHLV (B) YDQGLV (C) YEQHLV (D) YDSTVL

Directions (Q. 64-65): Study the following information carefully and answer the questions given below:
 Point A is 10m north of Point B. Point C is 10m east of Point B and Point D is 4m north of Point C. Point E is 6m west of Point D. Point F is 8m north of Point E. Point G is 4m west of Point F.

- 64) Point D is in which direction with respect to F?
 (A) South (B) East (C) Southeast (D) North
- 65) Which of the following three points lie in a straight line?
 (A) E, D and F (B) B, A and G (C) B, C and E (D) E, F and G

Directions (Q 66-68): These questions are based on the five three-letter words given below:

HAT BIT GOD RAM CUT

- 66) If the first letter in each of the word is changed to the next letter in English alphabetical order, how many words thus formed will have more than one consonant?
 (A) One (B) Two (C) Three (D) More than Three
- 67) If in each of the words, all the letters are arranged in English alphabetical order within the word, how many words will remain unchanged?
 (A) One (B) Two (C) Three (D) More than Three
- 68) How many letters are there in the English alphabetical order between the first letter of the second word from the left and the third letter of the third word from the right?
 (A) One (B) Two (C) Three (D) More than Three

Directions (Q 69-72): In each of the following questions, two statements are given followed by three or four conclusions numbered I, II, III and IV etc. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.

- 69) **Statements:** All branches are flowers. All flowers are leaves.
Conclusions: I. All branches are leaves.
 II. All leaves are branches.
 III. All flowers are branches.
 IV. Some leaves are branches
 (A) None follows (B) Only I and IV follow
 (C) Only II and III follow (D) All follow
- 70) **Statements:** Some bags are pockets. No pocket is a pouch.
Conclusions: I. No bag is a pouch. .
 II. Some bags are not pouches.
 III. Some pockets are bags.
 IV. No pocket is a bag
 (A) None follows (B) Only I and III follow
 (C) Only II and III follow (D) All follow
- 71) **Statements:** Some taxis have horns. Some taxis have lights.
Conclusions: I. Every taxi has either horn or light.
 II. Some taxis have neither light nor horn.
 III. Some taxis have horns as well as lights.
 IV. No taxi has horn as well as light.
 (A) Only I and II follow (B) Only II and III follow
 (C) Only II and IV follow (D) Either III or IV follows
- 72) **Statements:** No box is toy. All toys are blocks.
Conclusions: I. Some blocks are toys.
 II. Some blocks are boxes.
 III. No block is a box.
 (A) Only I follows (B) Only either II or III follows
 (C) Only either II or III and I follow (D) None follows
- 73) If 'orange' is called 'butter', 'butter' is called 'soap', 'soap' is called 'ink', 'ink' is called 'honey' and 'honey' is called 'orange', which of the following is used for washing clothes?
 (A) Honey (B) Butter (C) Orange (D) Ink
- 74) On another planet, the local terminology for 'earth', 'water', 'light', 'air' and 'sky' are 'sky', 'light', 'air', 'water', 'earth', respectively. If someone is thirsty there, what would he drink?
 (A) Light (B) Air (C) Sky (D) Water
- 75) If the animals which can walk are called 'swimmers', animals who crawl are called 'flying', those living in water are called 'snakes' and those which fly in the sky are called 'hunters', then what will a lizard be called?
 (A) Swimmers (B) Snakes (C) Flying (D) Hunters

x-x-x

- 1) **A short-term government security paper is called:**
(A) Share (B) Debenture (C) Mutual fund (D) Treasury bill
- 2) **In Economics, production means:**
(A) manufacturing (B) making
(C) creating utility (D) farming
- 3) **Production function expresses:**
(A) technological relationship between physical inputs and output
(B) financial relationship between physical inputs and output
(C) relationship between finance and technology
(D) relationship between factors of production
- 4) **The definition of 'small-scale industry' in India is based on:**
(A) sales by the unit
(B) investment in machines and equipment's
(C) market coverage
(D) export capacity
- 5) **The reserves held by Commercial Banks over and above the statutory minimum, with the RBI are called:**
(A) Cash reserves
(B) Deposit reserves
(C) Excess reserves
(D) Momentary reserves
- 6) **Which among the following Indian State does not transact its business through the Reserve Bank of India?**
(A) Sikkim (B) Jammu and Kashmir
(C) Arunachal Pradesh (D) Mizoram
- 7) **Which among the following a unit of measurement is known as paper gold?**
(A) Euro-dollar (B) Petro dollar
(C) GDR (D) SDR
- 8) **What are the main components of basic social infrastructure of an economy?**

- (A) Education, Industry and Agriculture
 (B) Education, Health and Civil amenities
 (C) Transport, Health and Banks
 (D) Industry, Trade and Transport
- 9) Which is the first national park established in India?**
 (A) Velvadan National Park (B) Periyar National Park
 (C) Bandipur National Park (D) Corbett National Park
- 10) In which of the following cities the first private channel of FM Radio was started?**
 (A) Chennai (B) Mumbai (C) Kolkata (D) Bangalore
- 11) Which of the following is the first missile which has been developed in India?**
 (A) Akash (B) Prithvi (C) Agni (D) Trishul
- 12) Who developed the first automatic automobile?**
 (A) Gottlieb Daimler (B) Henry Ford
 (C) Rudolf Diesel (D) Karl Benz
- 13) Which one among the following is the highest peak?**
 (A) Kamet (B) Kun Lun (C) Nanga Parbat (D) Nanda Devi
- 14) ISRO is an abbreviation for:**
 (A) Indian Scientific Research Organisation
 (B) International Space Research Organisation
 (C) International Sales Research Organisation
 (D) Indian Space Research Organisation
- 15) The full form of IRDA is:**
 (A) Insurance Regulatory and Development Authority
 (B) International Reconstruction and Development Association
 (C) India Road Development Agency
 (D) International Refinance and Development Association
- 16) Narain Karthikeyan is a sportsman in the field of:**
 (A) Formula one car racing (B) Shooting

- (C) Chess (D) Golf
- 17) **Who was the First Test Centurion in Indian cricket?**
 (A) Vinu Mankad (B) C.K. Naidu
 (C) Lala Amarnath (D) Mansur Ali Pataudi
- 18) **Who won the first Gold medal for an individual event at the Olympics for India?**
 (A) Maharaja Karni Singh (B) Abhinav Bindra
 (C) Major R.S. Rathore (D) Leander Paes
- 19) **Do or Die' is the famous slogan given by:**
 (A) Mahatma Gandhi (B) Vallabhbhai Patel
 (C) Jawaharlal Nehru (D) Rajiv Gandhi
- 20) **Who spoke, "At the stroke of midnight, when the world sleeps, India awakes to life and freedom"?**
 (A) Subhas Chandra Bose (B) Mahatma Gandhi
 (C) Jawaharlal Nehru (D) C. Rajagopalachari
- 21) **Match the artists with their art-form:**
- | | |
|-----------------------|-----------------------------|
| A. Jatin Das | 1. Sitar |
| B. Parveen Sultana | 2. Painting |
| C. Pradosh Dasgupta | 3. Hindustani music (Vocal) |
| D. Ustad Vilayat Khan | 4. Sculpture |
- (A) A-1, B-2, C-3, D-4 (B) A-2, B-3, C-4, D-1
 (C) A-3, B-4, C-2, D-1 (D) A-4, B-1, C-3, D-2
- 22) **Which is the major area where the 'Garba' dance form is common?**
 (A) Maharashtra (B) Gujarat (C) Rajasthan (D) Punjab
- 23) **Which has been the field of activity of Pt. Bhimsen Joshi?**
 (A) Literature (B) Classical music (Vocal)
 (C) Education (D) Journalism

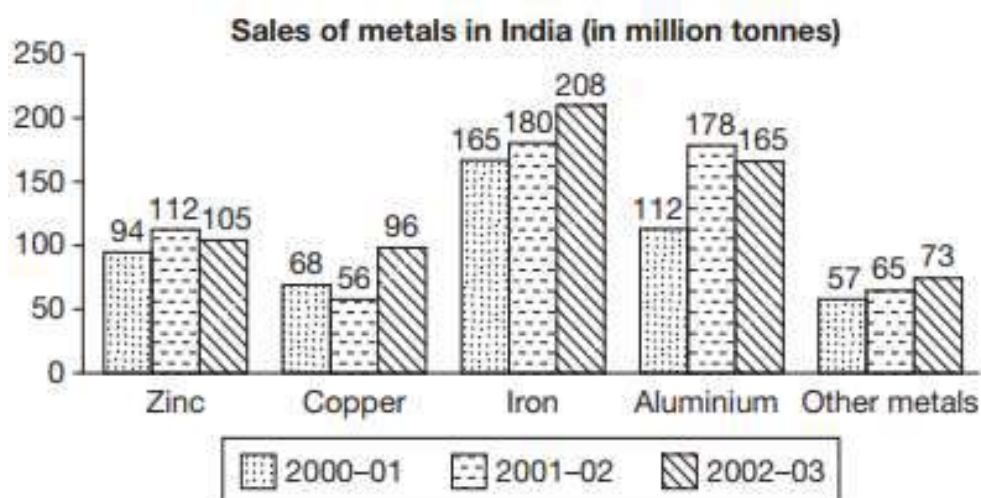
- 24) In which State the folk painting 'Madhubani' is popular?
- (A) West Bengal (B) Odisha (C) Bihar (D) Assam
- 25) Closed economy' is one in which
- (A) Only export takes place
- (B) Neither exports nor imports take place
- (C) Money supply is fully controlled
- (D) Exchange rates are under a full control of the government
- 26) Which of the following is not a fundamental right enshrined in the Indian Constitution?
- (A) Right to freedom of religion
- (B) Right to equality
- (C) Right to equal pay for equal work for men as well as women
- (D) Right to freedom of thought and expression
- 27) Which of the following items is not included in a country's balance of payments?
- (A) Shipping services (B) Interest received from abroad
- (C) Import and export duties (D) Tourists' expenditure
- 28) Mixed economy means
- (A) Co-existence of small and large industries
- (B) Promoting both agriculture and industries in the economy
- (C) Co-existence rich and poor
- (D) Co-existence of public and private sectors
- 29) Which of the following regulates the working of stock markets in India?
- (A) FEMA (B) RBI
- (C) SEBI (D) Ministry of Finance

Directions for question no. 30 to 33: The table below gives the population ratio of males to females and the percentage of literates in a region across six years.

Year	Population (lakhs)	Males : Females	Percentage of literate males	Percentage of literates
2010	7.3	1031 : 1000	61.2	52.6
2011	8.4	1073 : 1000	63.7	54.1
2012	8.7	1061 : 1000	64.5	55.2
2013	9.2	1089 : 1000	64.8	56.3
2014	8.1	1007 : 1000	65.2	56.5
2015	7.8	981 : 1000	64.5	55.7

- 30) What was the percentage increase in the number of males from 2011 to 2012?
- (A) 2 (B) 3 (C) 4 (D) 5
- 31) In which year was the percentage increase in the number of females, when compared to the previous year, the highest?
- (A) 2011 (B) 2012 (C) 2013 (D) 2014
- 32) What was the percentage of literate females in 2013?
- (A) 44.8 (B) 47.0 (C) 48.2 (D) 49.6
- 33) In which of the given years was the ratio of literate males to literate females, the highest?
- (A) 2010 (B) 2011 (C) 2012 (D) 2013

Directions for question no. 34 to 36: Answer the questions based on the information given below:-



- 34) The sales target for the sales of metals in the year 2002– 2003 was 20 % more than that of the actual sales in the year 2000–2001. What is the approximate percentage deficit or surplus achieved in the actual sales in the year 2002–2003?
- (A) 8 % deficit (B) 9 % surplus (C) 30 % surplus (D) 120 % deficit
- 35) If, for every year, the total sales of all metals are 80 % of their quantity available and the total sales in the year 2003–2004 for every metal was 25 % more than that in the year 2002–2003, then what was the quantity of copper available in the year 2003–2004 (in million tons)?
- (A) 120 (B) 150 (C) 1480 (D) 164
- 36) What is the average annual percentage increase in the sales of all the metals from the year 2000–2001 to the year 2002–2003?
- (A) 10.2 % (B) 11.2 % (C) 30.6 % (D) 15.2 %
- 37) What is the approximate ratio between the sales of Gold, which is 25% of that of 'Other metals', in 2002–2003 to the sales of silver, which is 20 % of that of 'Other metals' in 2000–2001?
- (A) 0.625 (B) 0.976 (C) 1.6 (D) 1.976

Directions for question no. 38 to 41: On the basis of the information given below.

A total of 512 players participated in a knockout tournament with different rounds. Players are seeded from Seed 1 to Seed 512 such that Seed 1 is the top Seed while seed 512 is the last seeded player. Matches are held in such a manner such that in the first round the 1st seeded player plays the last seeded player, similarly the 2nd seeded player plays the second last seeded player and so on. In each round, the winner of any match advances to the next round while the loser is knocked out of the tournament. This process is repeated till the finals when two players play amongst themselves to decide the winner. If at any point of time, a lower seeded player beats a higher seeded player, that match is defined as an upset. The matches are scheduled such that, in case of no upsets in each round, the highest seeded player plays the lowest seeded player left in the tournament, the second highest seeded player plays the second lowest seeded player left and so on. In case of an upset, the player who caused the upset (the lowest seeded player) would take the designated place of the player he upset (the highest seeded player) in the next round.

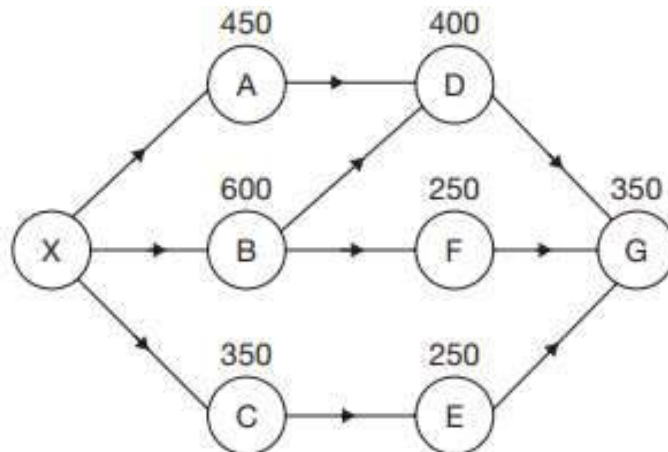
- 38) The player ranked 480 won the tournament. With which of the following seeded players, he must have not played in the semi-finals?
- (A) Seed 100 (B) Seed 109 (C) Seed 93 (D) Seed 83
- 39) If player seeded 403 won the tournament, he must not have played with which of the following players in the finals?
- (A) Seed 94 (B) Seed 84 (C) Seed 40 (D) Seed 93
- 40) Seed 100 must not have played with which of the following players in either the finals or the semi-finals?
- (A) Seed 97 (B) Seed 83 (C) Seed 92 (D) Seed 88

- 41) Player ranked 200 won the tournament. With which of the following seeded players, he must have not played in the quarter-finals?

(A) Seed 18 (B) Seed 17 (C) Seed 113 (D) Seed 16

Directions for question no. 42 to 45: On the basis of the information given below.

The following diagram gives the network used for supplying oil from a refinery X to depots A, B, C, D, E, F and G



The flow of oil is in the direction shown and is such that only after the demand at an intermediate depot is completely met, oil is passed on to the next depot in the network. The values alongside the depots represent the demand (in units) at each depot. It is also known that the flow of oil is such that the demand at all the depots is exactly met and that the capacity of each pipeline is 1000 units

Note: The slack in a pipeline is the excess flow that is required in the pipeline to bring it to full capacity

- 42) What is the maximum slack in the pipeline connecting X and B?
- (A) 100 units (B) 150 units (C) 200 units (D) 250 units
- 43) What is the maximum flow in the pipeline connecting C and E?
- (A) 750 units (B) 650 units (C) 600 units (D) 550 units
- 44) What is the sum of the slacks in all the pipelines put together?
- (A) 5750 units (B) 5950 units (C) 6100 units (D) 7350 units
- 45) If another depot H, located after G is connected to the network, then what is the maximum quantity of oil that can be supplied to H, all other values remaining the same?
- (A) 500 units (B) 450 units (C) 400 units (D) 350 units
- 46) The one thing that kept the ____ in good spirits at the otherwise disappointing Agra summit was the special bar for the ____ at the Mughal Sheraton.

- (A) press . . . people (B) scribes . . . media
(C) journalists . . . commoners (D) reporters . . . meeting
- 47) The _____ between the Platonic-Aristotelian speculation and the spirit of the Great Generation of Pericles, can be _____ throughout the ages.
- (A) animosity . . . detected (B) conflict . . . traced
(C) hostility . . . discovered (D) vendetta . . . exposed
- 48) The rains _____ the roads and many had to _____ from work.
- (A) inundated . . . abstain (B) slashed . . . salvage
(C) cascaded . . . refrain (D) coursed . . . oppugn

In the following passage, there are blanks, each of which has been numbered. These numbers are printed below the passage and against each, four words are suggested, one of which fits the blank appropriately. Find out the appropriate word in each case and mark its number as your answer for question 49 to 53.

Puritanism was the school master of the English middle classes. It heightened their virtues,

1. without eradicating, their convenient vices, and gave them an inexpugnable assurance that, behind virtues and vices alike, stood the majestic and
2. laws of an omnipotent Providence without whose
3. not a hammer could beat upon the forge. But it is a strange school which does not teach more than one lesson, and the social reactions of Puritanism,
4. permanent and profound are not to be summarized in the simple formula that it fostered individualism. Weber, in a celebrated essay
5. the thesis that Calvinism, in its English version, was the parent of Capitalism.

- 49) 1.
- (A) exemplified (B) sanctified (C) encumbered (D) invalidated
- 50) 2.
- (A) inextricable (B) savage (C) gargantuan (D) inexorable
- 51) 3.
- (A) foreboding (B) foreknowledge (C) forethought (D) forfeiture

- 52) 4.
 (A) trenchant (B) profuse (C) insular (D) facetious
- 53) 5.
 (A) expounded (B) articulated (C) determined (D) expunged

In each question (54-56), there are five sentences/paragraphs. The sentence/paragraph labelled A is in its correct place. The four that follow are labelled B, C, D and E, and need to be arranged in the logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option

- 54) A. Let a man then know his worth, and keep things under his feet. Let him not peep or steal, or sulk up and down with the air of a charity-boy, a bastard, or an interloper in the world which exists for him.
 B. Yet they all are his, suitors for his notice, petitioners to his faculties that they will come out and take possession.
 C. To him a palace, a statue, or a costly book have an alien and forbidding air, much like a gay equipage, and seem to say, "Who are you, Sir?"
 D. The picture waits for his verdict; it is not to command him, but he is to settle its claim to praise.
 E. But the man in the street, finding no worth in himself which corresponds to the force which built a tower or sculptured a marble God, feels poor when he looks at these.
 (A) DCBE (B) BECD (C) DCEB (D) ECBD
- 55) A. The 78 Neanderthal bones at Moula Guercy cave come from at least six individuals: two adults, two 15 or 16-year olds, and two six or seven-year-olds.
 B. Cuts across the foot, ankle and elbow joints show that in every individual, at least one of, the Achilles tendon, toe flexor tendons, and the tendon of the biceps muscle were cut.
 C. All the skulls and limb bones were broken apart. Only the hand and foot bones remained intact.
 D. Other cuts show that the thigh muscles were also removed and in at least one case the tongue was cut out.
 E. In two of the younger individuals, the muscle used to clench the jaw was cut from the skull.
 (A) CEBD (B) CBED (C) ECDB (D) BCDE
- 56) A. Time-saving is the subject of scores of books with titles like 'Take Your Time', 'More Hours in My Day.'
 B. Does time-saving mean getting more done and if so, does talking on a cellular phone at a beach save time or waste it?

- C. We have all these ways to “save time”, but what does that concept really mean?
- D. Marketers anticipate our desire to save time, and respond with fast overs, quick freezing and fast credit.
- E. Does it make sense to say that driving saves ten minutes from your travel budget while removing ten minutes from your reading budget? These questions have no answers as they depend on a concept that is ill-formed: The very idea of time-saving.

(A) DCBE (B) CBDE (C) DBCE (D) CDBE

57) **MONEY : MERCENARY**

- (A) Fame : Soldier (B) Food : Glutton
- (C) Believer : Iconoclast (D) Sacrifice : Warrior

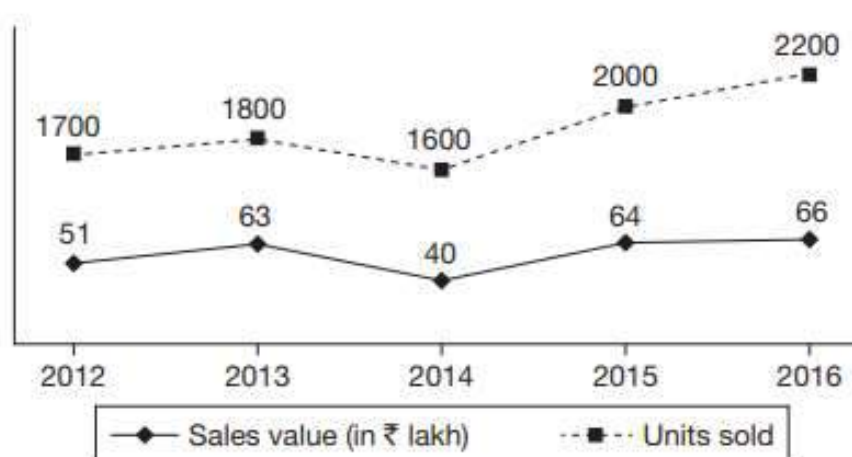
58) **EPHEMERAL : PERMANENT**

- (A) Superficial : Extraneous (B) Tenuous : Strong
- (C) Defiant : Stubborn (D) Holistic : Complete

59) **DISHONOUR : DEMEAN**

- (A) Demolish : Annihilate (B) Glorify : Extol
- (C) Consecrate : Sanctify (D) Articulate : Obfuscate

Answer the questions (60-63) based on the information given below and select the correct alternative from the given choices. The following graph provides the details of the number of units sold and the total sales value of Company X, which produces bicycles for the period from 2012 to 2016.



60) **What was the average price per bicycle sold in 2014?**

- (A) Rs. 2700 (B) Rs. 2200 (C) Rs. 2500 (D) Rs. 3000

- 61) In which of the following years was the percentage increase in the average price per bicycle the highest?
- (A) 2013 (B) 2014 (C) 2015 (D) 2016
- 62) In how many of the given years was the sales (by volume) of bicycles less than that of the average sales (by volume) in the entire period?
- (A) 1 (B) 2 (C) 4 (D) 3
- 63) If, in 2017, both the number of units sold increases by 25% and the total sales (value) by 50% when compared to 2016, then what is the average price per bicycle sold in 2017?
- (A) Rs. 3200 (B) Rs. 3500 (C) Rs. 3900 (D) Rs. 3600
- 64) If A works alone, he would take 4 days more to complete the job than if both A and B worked together. If B worked alone, he would take 16 days more to complete the job than if A and B work together. How many days would they take to complete the work if both of them worked together?
- (A) 10 days (B) 12 days (C) 6 days (D) 8 days
- 65) 250 men can finish a work in 20 days working 5 hours a day. To finish the work within 10 days working 8 hours a day, the minimum number of men required is:
- (A) 310 (B) 300 (C) 313 (D) 312
- 66) 2 men and 5 women can do a work in 12 days. 5 men and 2 women can do that work in 9 days. Only 3 women can finish the same work in:
- (A) 36 days (B) 21 days (C) 30 days (D) 42 days
- 67) 7 men can complete a piece of work in 12 days. How many additional men will be required to complete double the work in 8 days?
- (A) 28 (B) 21 (C) 14 (D) 7
- 68) 8 men can complete a piece of work in 20 days. 8 women can complete the same work in 32 days. In how many days will 5 men and 8 women together complete the same work?
- (A) 16 days (B) 12 days (C) 14 days (D) 10 days
- 69) The Ad Line 'Connecting People' is linked with:
- (A) Sony Ericsson (B) Nokia
(C) Motorola (D) Airtel
- 70) The currency of Myanmar is:
- (A) Dollar (B) Rupee (C) Taka (D) Kyat

- 71) **Find the odd one:**
- (A) George W Bush (B) Bill Clinton
(C) Jimmy Carter (D) Tony Blair
- 72) **Where is the largest reflecting telescope of Asia?**
- (A) Kodaikanal (B) Ooty
(C) Kavalur (D) Naini Tal
- 73) **Which of the following organizations is the oldest?**
- (A) IMF (B) WHO (C) ILO (D) FAO
- 74) **The first Guinness Book of World Records appeared in the year:**
- (A) 1950 (B) 1954 (C) 1960 (D) 1963
- 75) **Standard 18-carat gold sold in the market is:**
- (A) 82 parts gold and 18 parts other metal
(B) 18 parts gold and 82 parts other metal
(C) 18 parts gold and 6 parts other metal
(D) 9 parts gold and 15 parts other metal
- 76) **The term 'dialectics' refers to:**
- (A) ideological conflicts
(B) unification of opposites
(C) deriving the truth after debates and discussions
(D) materialist decision
- 77) **A country has sufficient international liquidity if it can cover any balance of payment deficit with enough of:**
- (A) its own money (B) tax revenue
(C) natural resources (D) gold and/or convertible currency
- 78) **The main advocate of Utilitarianism is:**
- (A) Herbert Spencer (B) J.S. Mill
(C) Abraham Lincoln (D) Jeremy Bentham
- 79) **TRIPS stands for:**
- (A) Trade related investment property rights
(B) Trade related inherited property rights

- (C) Trade related intellectual property rights
- (D) Trade related interest property rights

80) NASDAQ stands for:

- (A) National Association of Shares Dealers Automated Quotation
- (B) National Association of Stock Dealers Automated Quotation
- (C) National Association of Securities Dealers Automated Quotation
- (D) National Association of Small Units Automated Quotation

81) Who created 'Hotmail'?

- (A) Sameer Bhatia
- (B) Bill Gates
- (C) Jack St. Clair Kilby
- (D) Donald W. Davies

82) The origin of the phrase 'United Nations' is associated with one of the following personalities:

- (A) Jawaharlal Nehru
- (B) Franklin Roosevelt
- (C) Charles de Gaulle
- (D) Woodrow Wilson

83) The Asian Development Bank has its headquarters at:

- (A) New Delhi
- (B) Tokyo
- (C) Colombo
- (D) Manila

84) A situation where a country exports a product at a price below its cost of production.

- (A) Full cost pricing
- (B) New protectionism
- (C) Dumping
- (D) Price skimming

85) Which of the following is NOT likely to be a benefit that host countries will obtain from MNCs?

- (A) Technology transfer
- (B) Import substitution
- (C) The ability to impose high tax rates on them
- (D) Job creation

x-x-x

M.P.Ed. (Master of Physical Education)

- 1) **The main aim of classroom teaching is**
(A) To provide information to students
(B) To develop inquiring mind of students
(C) To develop the personality of students
(D) To help students pass examinations
- 2) **The major function of the ligaments in the body is to**
(A) Keep the body straight
(B) Hold the bones together at the joints
(C) Help the individual move fast
(D) Give strength to the skeleton
- 3) **Exercise done in the presence of oxygen is called**
(A) Aerobic (B) Anaerobic (C) Isometric (D) Isotonic
- 4) **The father of anthropometry is**
(A) Boron Quetelet (B) Martens
(C) Spielberger (D) Carron
- 5) **Theory of Motivation (Drive Reduction theory) was developed by**
(A) Clark Hull (B) Carron
(C) Martens (D) Yuri Hania
- 6) **In which of the following year the first World Cup Hockey Men tournament was held?**
(A) 1970 (B) 1971 (C) 1972 (D) 1973
- 7) **In which of the following events in the first Commonwealth Games, were women allowed to participate?**
(A) Athletics (B) Wrestling (C) Swimming (D) Boxing
- 8) **'ATLAS OF MAN' which describes the body types was authored by:**
(A) Heath (B) Carter (C) Sheldon (D) Kretchmer
- 9) **International Hockey Stadium is a field hockey stadium in Mohali, Punjab, India is renamed after which prominent player?**
(A) Balbir Singh Senior (B) Manpreet Singh
(C) Rajpal Singh (D) Ajitpal Singh
- 10) **Who won the first individual gold medal for India at Olympics?**
(A) Abhinav Bindra (B) Neeraj Chopra
(C) P.T Usha (D) Milkha Singh
- 11) **Who was the first Olympic medalist of India during pre-independence era i.e. colonial India?**
(A) Norman Pritchard (B) K D Yadav

- (C) YK Yadav (D) Norman Stelio
- 12) **Deficiency of 'Vitamin D' causes**
 (A) Beri Beri (B) Scurvy
 (C) Rickets (D) Night Blindness
- 13) **Which state after Haryana fared in terms of medals at the Birmingham Commonwealth Games 2022?**
 (A) Manipur (B) Maharashtra
 (C) Punjab (D) Delhi
- 14) **In which event India earned a top 2 finish for the first time ever in men's event at the Commonwealth Games 2022?**
 (A) Triple jump (B) High jump
 (C) Javelin throw (D) Shot put
- 15) **Which one of the following is called non-probability sampling?**
 (A) Quota Sampling (B) Cluster sampling
 (C) Stratified sampling (D) Systematic sampling
- 16) **Who among the followings had won the overall championship in 1st edition of Khelo India University Games?**
 (A) Jain University (B) Panjab University
 (C) Guru Nanak Dev University (D) Lovely Professional University
- 17) **The term 'bicycle kick' is used in which game?**
 (A) Football (B) Gymnastic
 (C) Swimming (D) Diving
- 18) **In which year NSNIS (Patiala) was established?**
 (A) 1958 (B) 1959 (C) 1960 (D) 1961
- 19) **Which one among the following is the most comprehensive source of population data?**
 (A) Census (B) National sample survey
 (C) Demographic health survey (D) National Family health survey
- 20) **Which sports is excluded from the Commonwealth Games 2022?**
 (A) Shooting (B) Badminton
 (C) Tennis (D) Football
- 21) **Fatigue in sports is due to**
 (A) Formation of lactic acid (B) Lack of physical activity
 (C) Having a mental tension (D) Improper playing surface
- 22) **In which Olympic Games did India last win a gold medal in Men Hockey?**
 (A) 1960 (B) 1964 (C) 1972 (D) 1980
- 23) **With which of the following games is the Durand Cup associated?**
 (A) Badminton (B) Handball (C) Football (D) Basketball
- 24) **Which tissues help more in learning swimming?**

- (A) Epithelial (B) Connective (C) Adipose (D) Nervous
- 25) In Olympics, the Marathon race for women was introduced in the year
(A) 1984 (B) 1980 (C) 1976 (D) 1988
- 26) When did the Amateur Athletics Federation of India was established?
(A) 1936 (B) 1946 (C) 1949 (D) 1950
- 27) Which one of the following is a muscle protein?
(A) Hemoglobin (B) Myoglobin (C) Myosin (D) Calcium
- 28) Psycho –Analytic theory propounded by
(A) Thorndike (B) Plato
(C) Freud (D) Clarke & Clarke
- 29) When did India finished as runners-up in the Davis Cup for the first time?
(A) 1966 (B) 1968 (C) 1977 (D) 1986
- 30) Which state has hosted the 5th Khelo India Youth Games?
(A) Karnataka (B) Madhya Pradesh
(C) Haryana (D) Punjab
- 31) The theory of Insight learning was propounded by
(A) Tollman (B) Smith (C) Bartlet (D) Kohler
- 32) Independent student t-test is used to compare
(A) Two means (B) More than two means
(C) Three means (D) More than three means
- 33) A successful teacher is one who is
(A) Compassionate and disciplinarian (B) Quiet and reactive
(C) Tolerant and dominating (D) Passive and active
- 34) The length of acceleration zone in 4×100 meter relay race shall be
(A) 05 m (B) 10m (C) 20m (D) 15m
- 35) What was the official mascot of 2nd Khelo India University Games?
(A) Veera (B) Jiya (C) Vijiya (D) Dhakad
- 36) When was the first Olympic Day celebrated?
(A) 1896 (B) 1924 (C) 1948 (D) 1984
- 37) What is the exact order of the colour of Olympic rings?
(A) Blue, yellow, black, green and red
(B) Blue, black, green, yellow and red
(C) Blue, green, yellow, black and red
(D) Yellow, blue, black, green and red
- 38) The irregular bones are found in
(A) Chest (B) Cheeks (C) Legs (D) Arms

- 39) **Who is the India's youngest Olympic women medalist**
 (A) PV Sindhu (B) Saina Nehwal
 (C) Lovlina Borgohain (D) Sakshi Malik
- 40) **Insulin is secreted by**
 (A) Spleen (B) Thyroid glands
 (C) Pancreas (D) Liver
- 41) **To break tie in Discus throw**
 (A) One additional trial is given
 (B) Average of all trials is taken
 (C) Last attempt is considered
 (D) Second best performance is considered
- 42) **Who was the first person to take oath in 1920 Modern Olympic Games?**
 (A) Camille Mandrillon (B) Vegard Ulvang
 (C) Edwin Moses (D) Victor Boin
- 43) **2026 Asian Games going to be held at:**
 (A) Aichi-Nagoya (B) Seoul
 (C) Hangzhou (D) Jakarta
- 44) **The term 'chukker' is associated with which sports**
 (A) Boxing (B) Polo
 (C) Wrestling (D) Gymnastics
- 45) **The term 'Gambit' associated with which sports:**
 (A) Wrestling (B) Chess
 (C) Weightlifting (D) Shooting
- 46) **Who was the flag bearer of Indian contingent during the opening ceremony at 2022 Commonwealth Games?**
 (A) Achanta Sharath Kamal (B) Manpreet Singh
 (C) Nikhat Zareen (D) Mary Kom
- 47) **Total number of medals won by India at Birmingham, 2022 Commonwealth Games:**
 (A) 61 (B) 62 (C) 65 (D) 66
- 48) **In the 1958 Commonwealth Games, the legendary Milkha Singh secured the gold medal in 400m with a new national record**
 (A) 46.6 seconds (B) 46.8 seconds
 (C) 46.9 seconds (D) 47.01 seconds
- 49) **In a single league fixture of eight teams, the total number of matches to be played shall be**
 (A) Fifteen (B) Thirty
 (C) Fifty six (D) Twenty eight

- 50) In which edition of commonwealth games India won the maximum medals and how many medals did India won?**
 (A) XIX edition with 101 medals (B) XVIII edition with 101 medals
 (C) XII edition with 101 medals (D) XIV edition with 101 medals
- 51) Who won the FIFA World Cup Golden Boot award at Qatar 2022?**
 (A) Lionel Messi (B) Kylian Mbappe
 (C) Olivier Giroud (D) Julian Alvarez
- 52) Which of the following had won IPL 2022?**
 (A) Gujarat Titans (B) Rajasthan Royals
 (C) Chennai Super kings (D) Mumbai Indians
- 53) Which of the followings country going to host the 2023 ICC Men's Cricket World Cup?**
 (A) India (B) New Zealand
 (C) Australia (D) USA
- 54) Who developed the continuous training method?**
 (A) E.V. Aaken (B) Morgan and Adamson
 (C) Herbert Spencer (D) W. Greschler
- 55) The number of hurdles/barriers in 3000m steeple chase are:**
 (A) 15 (B) 24 (C) 28 (D) 30
- 56) The term 'half nelson' is associated with which game**
 (A) Judo (B) Wrestling (C) Boxing (D) Badminton
- 57) What is the weight of table tennis ball?**
 (A) Between 1.67 g to 1.77 g (B) Between 2.67 g to 2.77 g
 (C) Between 3.67 g to 3.77 g (D) Between 4.67 g to 4.77 g
- 58) Who is the current president of IOA?**
 (A) P.T. Usha (B) Rajeev Mehta
 (C) R. S. Mittal (D) Narinder Batra
- 59) In 110 m hurdles, the distance between the first hurdle from the starting line is :**
 (A) 12.72 metres (B) 13.72 metres
 (C) 14.72 metres (D) 15.72 metres
- 60) What is a judo costume called?**
 (A) Wazari (B) Judogi (C) Judoka (D) Shiyajo
- 61) What is the height of 110 m hurdle?**
 (A) 1.067 cm (B) 1.069cm (C) 1.065 cm (D) 1.070 cm
- 62) Who won the men singles 2022 French Open Tournament?**
 (A) Novak Djokovic (B) Rafael Nadal

- (C) Daniil Medvedev (D) Alexander Zverev
- 63) Which one of the following elements of management is unpredictable?
(A) Method (B) Material (C) Money (D) Man
- 64) Which of the following event is not in Decathlon?
(A) Javelin throw (B) 1500 meter race
(C) 110 meter Hurdles (D) 800 meter race
- 65) Find the missing number in the following series?
132 156 ? 210 240 272
(A) 182 (B) 190 (C) 196 (D) 204
- 66) 37th National Games of India are going to be held at:
(A) Bhuvneshwar (B) Madhya Pradesh
(C) Goa (D) Uttar Pradesh
- 67) The first women Asian Gold medalist in athletics is
(A) M.D.Valasamma (B) Rosa kutti
(C) Kamaljeet Sandhu (D) P.T. Usha
- 68) The imitation method of teaching is best suited to teaching
(A) Adolescents (B) Children (C) Adults (D) Women
- 69) Who invented the game of basketball?
(A) James N. Smith (B) W.A. Morgan
(C) C.A. Bucher (D) Orbeteuffer
- 70) White Blood cells are also called:
(A) Leukocytes (B) Thrombocytes
(C) Platelets (D) Plasma
- 71) Who won the 2022 Women's FIH Hockey World Cup?
(A) Netherlands (B) Australia (C) Argentina (D) Germany
- 72) What was the slogan of 2022 FIFA World Cup?
(A) Now is all (B) All in same rhyme
(C) We are one (D) All are different
- 73) When was the National Discipline Scheme founded by General J.K.Bhonsle?
(A) 30 January, 1952 (B) 26 January, 1956
(C) 26 July, 1954 (D) 1 April, 1957
- 74) Find the missing number in the series?
4, 18, ?, 100, 180, 294, 448
(A) 48 (B) 50 (C) 58 (D) 60
- 75) Find a pair similar to ARROW:BOW from the following
(A) Football: Hand (B) Smoke : Water
(C) Bullet: Rifle (D) Salad : Knife

B.P.Ed. (Bachelor of Physical Education)

1. First Indian athlete to win a medal in 'World Championships in Athletics' competition
(A) PT Usha (B) Milkha Singh
(C) Anju Bobby George (D) KM Beenamol
2. If OUT is coded as 152120, IN will be coded as:
(A) 1015 (B) 914
(C) 1813 (D) 919
3. Which of the following is not a type of sprain?
(A) Severe sprain (B) Primary sprain
(C) Moderate sprain (D) Mild sprain
4. Dislocation injury commonly occurs at which of the following joint?
(A) Elbow joint (B) Hip joint
(C) Knee joint (D) Shoulder joint
5. Which of the following vitamin is known as Folic acid?
(A) B₁ (B) B₂
(C) B₇ (D) B₉
6. What is the official slogan of the 2024 Paris Olympics?
(A) Games Wide Open (B) Global Partnership
(C) Inclusive and Impressive (D) Brotherly and Beautiful
7. Who is called the Father of the Olympiad?
(A) Jacques Rogge (B) Michael James
(C) Pierre de Coubertin (D) Stephanie Rice
8. Cardiac output is the amount of blood by a ventricle in one
(A) Second (B) Relaxation
(C) Minute (D) Contraction
9. The term 'Ippon' is related which of the following sports?
(A) Judo (B) Archery
(C) Boxing (D) Wrestling
10. The term 'Dig' is used in which of the following games?
(A) Football (B) Basketball
(C) Volleyball (D) Hockey
11. In the 3000 m steeple chase races the numbers of hurdles and water jumps an athlete need to cross are:
(A) 26 and 7 (B) 26 and 8
(C) 24 and 9 (D) 28 and 7

12. The term “Psychology” is derived from two Greek words?
 (A) Psyche and Logos (B) Psy and Logus
 (C) Psych and Logus (D) Psyc and Logos
13. Which of the following is not a part of small intestine?
 (A) Rectum (B) Duodenum
 (C) Ileum (D) Jejunum
14. “Rotator Cuff” injury is of which of the following joint?
 (A) Ankle (B) Knee
 (C) Hip (D) Shoulder
15. India won how many medals in the Birmingham Commonwealth game in 2022?
 (A) 21 Gold, 17 Silver and 22 Bronze (B) 22 Gold, 17 Silver and 23 Bronze
 (C) 22 Gold, 16 Silver and 23 Bronze (D) 21 Gold, 16 Silver and 24 Bronze
16. Which of the following is not a Narcotics Drug?
 (A) Opium (B) Morphine
 (C) Amphetamine (D) Cocaine
17. The noise pollution is measured in which of the following units?
 (A) Hertz (B) Loudness
 (C) Decibel (D) Pitch
18. National Malaria Control Programme (NMCP) was launched by the Government of India in the year:
 (A) 1952 (B) 1953
 (C) 1954 (D) 1955
19. Which of the following is not a communicable disease?
 (A) Diabetes Mellitus (B) Conjunctivitis
 (C) Influenza (D) Tuberculosis
20. Which of the following is not a skin injury?
 (A) Incision (B) Abrasion
 (C) Strain (D) Avulsion
21. AIDS is caused by HIV, which means:
 (A) Human immuno virus (B) Human immunodeficiency virus
 (C) Human immune virus (D) Human immdeficiency virus
22. Which of the following is not a popular example of web based search engines?
 (A) Google (B) Bing
 (C) Yahoo (D) Edge

23. Which of the following is not a popular platform to provide resources for online classes?
- (A) Zoom (B) Microsoft Teams
(C) Google Meet (D) Acrobat Reader
24. Who was the Indian captain in the first World Cup Cricket in 1975?
- (A) Kapil Dev (B) Sunil Gavaskar
(C) Srinivas Venkataraghavan (D) Bishan Singh Bedi
25. Which one is the oldest football competition in India?
- (A) Federation Cup (B) BC Roy Trophy
(C) Santosh Trophy (D) Durand Cup
26. Which cricket ground in Australia is known as “Gabba”?
- (A) Melbourne (B) Sydney
(C) Brisbane (D) Perth
27. Who among the following is the first Indian to be elected as FIFA Council member:
- (A) Sharad Pawar (B) Praful Patel
(C) Bhaichung Bhutia (D) Pankaj Gupta
28. The book “Runs’n Ruins” is written by?
- (A) Sunil Gavaskar (B) Ravi Sharstri
(C) Kapil Dev (D) Mohammad Azharuddin
29. ‘Nomura Cup’ is associated with which game?
- (A) Badminton (B) Golf
(C) Basketball (D) Hockey
30. Which company is the official tennis ball supplier to the Wimbledon
- (A) SIS (B) Nike
(C) ZEBSCO (D) Slazenger
31. Which city host the final of FIFA World Cup 2010?
- (A) Cape Town (B) Durban
(C) Johannesburg (D) Pretoria
32. ‘Pyknic’ is one of the body type as classified by
- (A) Kretchmer (B) Sheldon
(C) Thorndike (D) Bucher
33. Seeking of ‘Truth, Beauty and Goodness’ is aim of
- (A) Realism (B) Pragmatism
(C) Idealism (D) Naturalism
34. The ‘Coccyx’ consists of

- (A) 12 vertebrae (B) 7 vertebrae
(C) 5 vertebrae (D) 4 vertebrae
35. 'Beighton Cup' is associated with the game of
(A) Hockey (B) Table Tennis
(C) Volleyball (D) Football
36. 'Trapezius' muscle is located in
(A) Lower Back (B) Abdominal
(C) Upper Back (D) Chest
37. Water soluble vitamins include
(A) Vitamin C (B) Vitamin D
(C) Vitamin K (D) Vitamin A
38. Patanjali developed 8 components of yoga known as
(A) Asana (B) Hatha Yoga
(C) Ashtanga Yoga (D) Yoga Mimamsa
39. When do celebrate International Yoga Day?
(A) 22 June (B) 20 June
(C) 29 June (D) 21 June
40. The National Sports Day in India is celebrated on
(A) 27 August (B) 29 August
(C) 30 August (D) 28 August
41. The Instrument to measure height is called:
(A) Stadiometer (B) Dynamometer
(C) Goniometer (D) Vernier caliper
42. _____ is the smallest bone in the human body.
(A) Stapes (B) Scaphoid
(C) Malleus (D) Pisiform
43. In the technical terms, muscle pull is known as:
(A) Sprain (B) Strain
(C) Abrasion (D) Contusion
44. In which year was the Olympic flag raised for the first time?
(A) 1916 (B) 1920
(C) 1924 (D) 1932
45. Hypothalamus is associated with the control of :
(A) Emotions (B) Glands
(C) Thinking (D) Motor actions
46. The two great dangers of wounds are:
(A) Pain and swelling (B) Shock and shivering

- (C) Bleeding and infection (D) Burning and loss of tissue
47. In which Olympic did women participate for the first time?
 (A) 1920 Antwerp (B) 1986 Athens
 (C) 1928 Amsterdam (D) 1900 Paris
48. The longest muscle in the body is:
 (A) Deltoid (B) Pectoralis Major
 (C) Sartorius (D) Iliopsoas
49. When was the opening ceremony of the first Olympic Games?
 (A) 6 March 1896 (B) 6 April 1896
 (C) 6 May 1896 (D) 6 June 1896
50. How many nations participated in the 1896 Olympics?
 (A) 12 Nations (B) 13 Nations
 (C) 14 Nations (D) 16 Nations
51. Which kind of muscle gets tired by prolonged periods of activity?
 (A) Cardiac (B) Non-striated
 (C) Striated (D) Muscles will not get tired
52. What is the 100m World Record of Usain Bolt?
 (A) 9.52 seconds (B) 9.58 seconds
 (C) 9.69 seconds (D) 9.72 seconds
53. Recreation Movement in India was started by
 (A) G.D. Sondhi (B) H.C. Buck
 (C) Vaidya P.R. (D) De Mellow
54. 'Lady Ratan Tata' Trophy is associated with the game of
 (A) Kho-Kho (B) Hockey
 (C) Football (D) Volleyball
55. What is the stick used in Snooker called:
 (A) Heave (B) A Cue
 (C) Paddle (D) Tago
56. If NOIDA is written as OPJEB, then what will be the code for DELHI?
 (A) EFMK (B) EFAMK
 (C) EFMIJ (D) EFMAK
57. Who is known as "The Baltimore Bullet"?
 (A) Usain Bolt (B) Michael Jordan
 (C) Michael Phelps (D) Roger Federer
58. The number comes next in the series 6, 11, 21, 36, 56, ?
 (A) 81 (B) 91
 (C) 71 (D) 101

59. Which of the following pairs of words are differently related?
- (A) Kind : Cruel (B) Slow : Sluggish
(C) Stale : Fresh (D) Truth : Lie
60. Ram says "Anuj's mother is the only daughter of my mother." How is Anuj related to Ram?
- (A) Brother (B) Father
(C) Nephew (D) Uncle
61. 'BC Gupta Trophy' is associated with which sports?
- (A) Football (B) Basketball
(C) Kabaddi (D) Cricket
62. Softness of bones is known as
- (A) Osteoclast (B) Osteoblast
(C) Osteoporosis (D) Osteomalacia
63. Dick Fosbury who invented the 'Fosbury Flop' style in high jump event belongs to
- (A) England (B) Russia
(C) Ukraine (D) USA
64. Renuka runs 13km to the South, turns left and runs 5 km. Again, he turns left and runs 13km. How far is he from his starting point?
- (A) 11km (B) 5km
(C) 8km (D) 13km
65. 'Michael Ferreira' is associated with the game of
- (A) Golf (B) Snooker
(C) Equestrian (D) Billiards
66. When was hockey added to Asian Games?
- (A) 1962, Jakarta (B) 1958, Tokyo
(C) 1951, Delhi (D) 1954, Manila
67. What is the old name of game volleyball?
- (A) Ping Pong (B) Hututu
(C) Mintonette (D) Masao
68. The colour of take off in Board Jump and in Triple Jump is
- (A) White (B) Red
(C) Green (D) Orange
69. What is the National Game of the USA?
- (A) Soccer (B) Basketball
(C) Baseball (D) Tennis
70. How many times has Brazil won the World Cup Football Championship?

- (A) Once (B) Twice
(C) Four (D) Five
71. 'Ezra Cup' is associated with the game of
(A) Hockey (B) Polo
(C) Rowing (D) Fencing
72. Which city is known as the 'Cathedral City of India'?
(A) Rameshwaram (B) Bhubaneswar
(C) Mathura (D) Konark
73. In which city the Asian Games first took place?
(A) Beijing (B) Kaula Lampur
(C) New Delhi (D) Tokyo
74. India first won the Olympic Hockey gold at
(A) London (B) Amsterdam
(C) Rome (D) Berlin
75. In a certain code language 'BORROW' is written as 'DRTUQZ' then how will 'CARBON' will be written in that language?
(A) EDTEQQ (B) DETEQP
(C) EDTEQP (D) DETEQR

x-x-x

MSc(HS)(Biochemistry)

1. Which are the cholesterol esters that enter cells through the receptor-mediated endocytosis of lipoproteins hydrolyzed?
(A) Endoplasmic reticulum (B) Lysosomes
(C) Plasma membrane receptor (D) Mitochondria
2. Oxidation of which substance in the body yields the most calories?
(A) Glucose (B) Glycogen (C) Protein (D) Lipids
3. HDL is synthesized and secreted from:
(A) Pancreas (B) Liver (C) Kidney (D) Muscle
4. A triose sugar is:
(A) Glycerose (B) Ribose (C) Erythrose (D) Fructose
5. Name the glucose transporter which is responsive to insulin in adipose tissue.
(A) GLUT2 (B) GLUT4 (C) GLUT1 (D) GLUT3
6. α -D-glucose and β -D-glucose are:
(A) Stereoisomers (B) Epimers (C) Anomers (D) Keto-aldo pairs
7. The sugar found in milk is
(A) Galactose (B) Glucose (C) Fructose (D) Lactose
8. Sucrose consists of:
(A) Glucose + glucose (B) Glucose + fructose
(C) Glucose + galactose (D) Glucose + mannose
9. The glycosaminoglycan which does not contain uronic acid is:
(A) Dermatan sulphate (B) Chondroitin sulphate
(C) Keratan sulphate (D) Heparan sulphate
10. The most abundant carbohydrate found in nature is:
(A) Starch (B) Glycogen (C) Cellulose (D) Chitin
11. Iodine gives a red colour with:
(A) Starch (B) Dextrin (C) Glycogen (D) Inulin
12. Gluconeogenesis is decreased by which of the following hormone.
(A) Glucagon (B) Epinephrine (C) Glucocorticoids (D) Insulin
13. Which of the following is intermediate in hexose monophosphate shunt pathway?
(A) D-Ribulose (B) D-Arabinose (C) D-xylose (D) D-Lyxose
14. Name the test that distinguish between monosaccharides and disaccharides.
(A) Bial's test (B) Seliwanoff's test (C) Barfoed's test (D) Hydrolysis test
15. Which of the following is not reducing sugar?

- (A) Lactose (B) Maltose (C) Sucrose (D) Fructose
16. Which of the following disaccharide linked by α -1-4 Glycosidic linkages?
 (A) Lactose (B) Sucrose (C) Cellulose (D) Maltose
17. Which of the following is an example of sulphur containing amino acid.
 (A) 2-Amino-3-mercaptopropanoic acid (B) 2-Amino-3-methylbutanoic acid
 (C) 2-Amino-3-hydroxypropanoic acid (D) Amino acetic acid
18. Which of the following amino acids is optically inactive?
 (A) Glycine (B) Serine (C) Threonine (D) Valine
19. Since the pK values for aspartic acid are 2.0, 3.9 and 10.0, it follows that the isoelectric (pH) is:
 (A) 2.95 (B) 3.90 (C) 5.90 (D) 8.90
20. Which of the following amino acid does not form an α -helix.
 (A) Valine (B) Proline (C) Tyrosine (D) Tryptophan
21. Which of the following is essential amino acid in man.
 (A) Aspartate (B) Tyrosine (C) Methionine (D) Serine
22. A ketogenic amino acid is:
 (A) Valine (B) Cysteine (C) Leucine (D) Threonine
23. Carbonic anhydrase is an example of
 (A) Lipoprotein (B) Phosphoprotein (C) Metalloprotein (D) Chromoprotein
24. Many globular proteins are stable in solution inspite they lack in:
 (A) Disulphide bonds (B) Hydrogen bonds (C) Salt bonds (D) Non polar bonds
25. Each turn of α -helix contains the amino acid residues (number):
 (A) 3.6 (B) 3.0 (C) 4.2 (D) 4.5
26. The lipoprotein associated with activation of LCAT is
 (A) HDL (B) LDL (C) VLDL (D) IDL
27. The apolipoprotein which forms the integral component of chylomicron is
 (A) ApoB-100 (B) ApoB-48 (C) Apo A1 (D) Apo A4
28. Aspirin inhibits the activity of the enzyme:
 (A) Lipoxygenase (B) Cyclooxygenase (C) Phospholipase A1 (D) Phospholipase A2
29. An important reaction for the synthesis of amino acid from carbohydrate intermediates is transamination which requires the cofactor:
 (A) Thiamin (B) Riboflavin (C) Niacin (D) Pyridoxal phosphate
30. Transfer of the carbamoyl moiety of carbamoyl phosphate to ornithine is catalyzed by a liver mitochondrial enzyme:

- (A) Carbamoyl phosphate synthetase (B) Ornithine transcarbamoylase
(C) N-acetyl glutamate synthetase (D) N-acetyl glutamate hydrolase
31. The enzyme dopamine β -oxidase which catalyses conversion of dopamine to norepinephrine requires
(A) Vitamin A (B) Vitamin C (C) Vitamin E (D) Vitamin B12
32. Secretion of glucagon results in:
(A) decrease of blood glucose
(B) dephosphorylation of glycogen phosphorylase
(C) dephosphorylation of glycogen synthase
(D) phosphorylation of glycogen phosphorylase
33. Tay-Sachs disease results from inherited deficiency of
(A) Arylsulphatase A (B) Hexosaminidase A
(C) Sphingomyelinase (D) Ceramidase
34. Alanine can be synthesized from:
(A) Glutamate and α -ketoglutarate (B) Pyruvate and glutamate
(C) Pyruvate and α -ketoglutarate (D) Aspartate and α -ketoglutarate
35. Free ammonia is released during
(A) Oxidative deamination of glutamate (B) Catabolism of purines
(C) Catabolism of pyrimidines (D) All of these
36. Histamine is formed from histidine by
(A) Deamination (B) Dehydrogenation (C) Decarboxylation (D) Carboxylation
37. Immunoglobulins are classified on the basis of:
(A) Type of light chains (B) Type of heavy chains
(C) Types of light and heavy chains (D) Molecular weight
38. The portion of the antigen molecule which is recognized by antibody is known as
(A) Hapten (B) Epitope (C) Complement (D) Variable region
39. Clonal selection occurs when antigen is encountered by
(A) Neutrophils (B) Mast cells (C) T-cells (D) Basophils
40. Complement system can be activated by binding of antigen to:
(A) IgA (B) IgD (C) IgE (D) IgM
41. C1 component of classical complement pathway is made up of
(A) Complements 1q and 1r (B) Complements 1q and 1s
(C) Complements 1r and 1s (D) Complements 1q, 1r and 1s
42. MHC proteins are unique to

- (A) Each cell (B) Each organ (C) Each individual (D) Each species
43. Passive immunity can be produced by administration of
- (A) Pure antigens (B) Immunoglobulins
(C) Toxoids (D) Killed bacteria or viruses
44. Milk is a good source of all of the following except
- (A) Essential amino acids (B) Vitamin C
(C) Galactose (D) Calcium and phosphorous
45. Synthesis of the following enzymes is increased during starvation.
- (A) Digestive enzymes (B) Gluconeogenic enzymes
(C) Urea cycle enzymes (D) Glucokinase
46. Serotonin is synthesised from
- (A) Serine (B) Phenylalanine (C) Tyrosine (D) Tryptophan
47. The phenomenon of inhibition of glycolysis by O_2 is termed as
- (A) Red drop (B) Pasteur effect (C) Michaelis effect (D) Fischer's effect
48. Plasma proteins are isolated by
- (A) Salting out (B) Electrophoresis (C) Fluorimetry (D) Both (A) and (B)
49. The 2 energy rich compounds needed for protein biosynthesis are
- (A) ATP and GTP (B) ATP and UTP (C) ATP and CTP (D) ATP and TTP
50. The movement of charged particles towards one of the electrodes under the influence of electrical current is
- (A) Gel filtration (B) Molecular sieving
(C) Gas liquid chromatography (D) Electrophoresis
51. If the fatty acid is esterified with an alcohol of high molecular weight instead of glycerol, the resulting compound is
- (A) Lipositol (B) Plasmalogen (C) Wax (D) Cephalin
52. Glycosphingolipids are a combination of
- (A) Ceramide with one or more sugar residues
(B) Glycerol with galactose
(C) Sphingosine with galactose
(D) Sphingosine with phosphoric acid
53. Long chain fatty acids are first activated to acyl-CoA in
- (A) Cytosol (B) Microsomes (C) Nucleus (D) Mitochondria
54. The enzymes of β -oxidation are found in
- (A) Mitochondria (B) Cytosol (C) Golgi apparatus (D) Nucleus

55. Which of the following is omega-3 polyunsaturated fatty acid?
 (A) Linoleic acid (B) α -Linolenic acid (C) γ -Linolenic acid (D) Arachidonic acid
56. Propionyl CoA is formed on oxidation of
 (A) Monounsaturated fatty acids
 (B) Polyunsaturated fatty acids
 (C) Fatty acids with odd number of carbon atoms
 (D) Saturated fatty acids
57. An enzyme required for the synthesis of ketone bodies as well as cholesterol is
 (A) Acetyl CoA carboxylase (B) HMG CoA synthetase
 (C) HMG CoA reductase (D) HMG CoA lyase
58. Net energy generation on complete oxidation of palmitic acid is
 (A) 132 ATP equivalents (B) 131 ATP equivalents
 (C) 130 ATP equivalents (D) 129 ATP equivalents
59. The carbon chain of fatty acids is shortened by 2 carbon atoms at a time. This involves successive reactions catalysed by 4-enzymes. These act the following order:
 (A) Acetyl CoA dehydrogenase, β -OH acyl CoA dehydrogenase, enoylhydase, thiolase
 (B) Acyl CoA dehydrogenase, thiolase, enoylhydase, β -OH acyl CoA dehydrogenase
 (C) Acyl CoA dehydrogenase, enoylhydase, thiolase, β -OH acyl CoA dehydrogenase
 (D) Enoylhydase, β -OH acyl CoA dehydrogenase, acyl CoA dehydrogenase, thiolase
60. The most potent Vitamin D metabolite is
 (A) 25-Hydroxycholecalciferol (B) 1,25-Dihydroxycholecalciferol
 (C) 24, 25-Dihydroxycholecalciferol (D) 7-Dehydrocholesterol
61. From the L ineweaver-Burk plot of Michaelis-Menten equation, K_m and V_{max} can be determined when V is the reaction velocity at substrate concentration S , the X-axis experimental data are expressed as
 (A) $1/V$ (B) V (C) $1/S$ (D) S
62. The kinetic effect of purely competitive inhibitor of an enzyme
 (A) Increases K_m without affecting V_{max} (B) Decreases K_m without affecting V_{max}
 (C) Increases V_{max} without affecting K_m (D) Decreases V_{max} without affecting K_m
63. Conversion of deoxyuridine monophosphate to thymidine monophosphate is catalysed by the enzyme:
 (A) Ribonucleotide reductase (B) Thymidylate synthetase
 (C) CTP synthetase (D) Orotidylic acid decarboxylase

64. Termination of the synthesis of the RNA molecule is signalled by a sequence in the template strand of the DNA molecule. Name the termination protein that recognize the signal.
- (A) Rho (ρ) factor (B) σ factor (C) δ factor (D) ϵ factor
65. The first codon to be translated on mRNA is
- (A) AUG (B) GGU (C) GGA (D) AAA
66. Initiation of protein synthesis begins with binding of
- (A) 40S ribosomal unit on mRNA
(B) 60S ribosomal unit
(C) Charging of tRNA with specific amino acid
(D) Attachment of aminoacyl tRNA on mRNA
67. In prokaryotes, chloramphenicol
- (A) Causes premature release of the polypeptide chain
(B) Causes misreading of the mRNA
(C) Depolymerises DNA
(D) Inhibits peptidyl transferase activity
68. Translocation of the newly formed peptidyl tRNA at the A site into the empty P site involves:
- (A) EF-I, GTP (B) EF-II, GTP
(C) EF-I, GDP (D) Peptidyl transferase, GTP
69. The gene which is transcribed during repression is
- (A) Structural (B) Regulator (C) Promoter (D) Operator
70. Restriction endonucleases recognize and cut a certain sequence of
- (A) Single stranded DNA (B) Double stranded DNA
(C) RNA (D) Protein
71. The region of DNA known as TATA BOX is the site for binding of
- (A) DNA polymerase (B) DNA topoisomerase
(C) DNA dependent RNA polymerase (D) Polynucleotide phosphorylase
72. Ribozymes are
- (A) Enzymes present in ribosomes
(B) Enzymes which combine the ribosomal subunits
(C) Enzymes which dissociate
(D) Enzymes made up of RNA
73. Nucleotides required for the synthesis of nucleic acids can be obtained from

- (A) Dietary nucleic acids and nucleotides
- (B) De novo synthesis
- (C) Salvage of pre-existing bases and nucleosides
- (D) De novo synthesis and salvage

74. Inosine monophosphate is an intermediate during the de novo synthesis of:

- | | |
|-----------------|-----------------|
| (A) AMP and GMP | (B) CMP and UMP |
| (C) CMP and TMP | (D) UMP and TMP |

75. 3'→5' Exonuclease activity of DNA polymerase I

- | | |
|------------------------------------|---|
| (A) Removes ribonucleotides | (B) Adds deoxyribonucleotides |
| (C) Corrects errors in replication | (D) Hydrolyses DNA into mononucleotides |

x-x-x

MSc(HS)(Biophysics)

1. Which of the following properties is not related to water?
(A) High dielectric constant (B) Dipolar nature
(C) Bond angle of 104.5° (D) Low heat of vaporization
2. If a reaction is at equilibrium, the free energy ΔG change is
(A) 1 (B) 0 (C) 10 (D) 0.1
3. Which of the following amino acid has sidechain that is negatively charged at physiological pH?
(A) Asp (B) His (C) Trp (D) Cys
4. All membrane processes, such as pumping and channeling of molecules are carried out by
(A) Lipids (B) Carbohydrates
(C) Nucleic acids (D) Proteins
5. A patch-clamp device is used to
(A) Measure the strength of an electrochemical gradient
(B) Study the properties of individual neurotransmitters
(C) Infuse different kinds of ions into an axon
(D) Study the properties of individual membrane channel
6. Which of the following cell components is not part of the cytoskeleton of eukaryotic cells?
(A) Microfilaments (B) Mitochondria
(C) Intermediate filaments (D) Microtubules
7. 1 a.m.u. is equivalent to
(A) 1.66×10^{-24} kg (B) 1.66×10^{-25} kg
(C) 1.66×10^{-27} kg (D) 1.66×10^{-17} kg
8. The most abundant intracellular free nucleotide is
(A) ATP (B) FAD^+ (C) NAD^+ (D) NADP^+
9. The wavelength corresponding to UV-visible range is
(A) 450nm-800nm (B) 200nm-800nm
(C) 450mm-800mm (D) 200mm-800mm
10. Long term reflex actions such as cycling and swimming are controlled by
(A) Cerebellum (B) Spinal cord
(C) Hypothalamus (D) Cerebrum
11. The most important factor in determining the percent oxygen saturation of hemoglobin is
(A) Partial pressure of oxygen (B) Acidity
(C) Partial pressure of carbon dioxide (D) Temperature

12. Okazaki fragments are
- (A) DNA fragments produced by radiation
 - (B) RNA primers required for initiation of DNA synthesis
 - (C) Short DNA fragments on the lagging strand
 - (D) Short fragments on the leading strand
13. Roentgen equivalent man (REM) is equal to
- (A) 1 sievert (B) 0.01 sievert (C) 100 sievert (D) 1000 sievert
14. Which of the following has least frequency
- (A) Infrared rays (B) Gamma Rays
 - (C) Microwaves (D) Ultraviolet rays
15. Melting of DNA results in
- (A) Decrease in optical density (B) Increase in optical density
 - (C) No change in optical density (D) None of these
16. SDS Page does not involve
- (A) Separation of proteins based on their molecular weights
 - (B) Denaturation of proteins with heat and chemicals
 - (C) Applications of an electric field to proteins
 - (D) Creating a temperature gradient for denaturation of proteins
17. Which of these acts as an inducer of the lac operon?
- (A) Allolactose (B) Sucrose (C) Galactose (D) Glucose
18. If inheritance of a disease to next generation is only possible through females, then the probable inheritance is
- (A) Sex-Linked (B) Mendelian (C) Organellar (D) Autosomal
19. Mode of DNA replication is
- (A) Conservative and bidirectional
 - (B) Semi conservative and unidirectional
 - (C) Semiconservative and bidirectional
 - (D) Conservative and unidirectional
20. B DNA, commonly known as Watson and Crick model of double helix DNA, has which of the following structural feature
- (A) The deoxyribose sugar puckering is C2' endo form
 - (B) Have 11.6 base pairs per turn
 - (C) Is left handed helical in structure
 - (D) Have a helical diameter of 28 Å
21. An enzyme catalyzed reaction was measured in the presence and absence of an inhibitor. For an uncompetitive inhibition,
- (A) only K_m is increased.

- (B) both K_m and V_{max} are decreased.
 (C) only V_{max} is decreased .
 (D) both K_m and V_{max} are not affected.
22. Each polypeptide strand of the single collagen molecule has
 (A) The conformation of a right-handed helix
 (B) The conformation of a left-handed helix
 (C) The conformation of a parallel beta-sheet
 (D) The conformation of a anti-parallel beta-sheet
23. Transition temperature of membrane bilayer is dependent on
 (A) Presence of internal proteins
 (B) Presence of transmembrane proteins
 (C) Degree to which the fatty acyl chains of the phospholipids are unsaturated
 (D) Protein to lipid ratio
24. Glucose transport across the plasma membrane is a type of
 (A) Simple diffusion
 (B) Reverse osmosis
 (C) Transportation through ion channels
 (D) Facilitated diffusion
25. In leads V1 and V2, the QRS recordings of the normal heart are mainly:
 (A) positive (B) negative (C) zero (D) random
26. All the following are considered “weak” interactions in proteins, except:
 (A) Ionic bonds (B) Peptide bonds
 (C) Van der Waal’s interactions (D) Hydrophobic interactions
27. Among the following which radioisotope is NOT a β emitter
 (A) C^{14} (B) P^{32} (C) I^{125} (D) H^3
28. In Brags equation $n\lambda = 2 d \sin \theta$, θ is
 (A) Angle between incident and refracted x ray beam
 (B) Angle between incident and diffracted x ray beam
 (C) Angle between incident x ray beam and plane of crystal surface
 (D) Angle between incident x ray beam and x-ray source
29. Which of the following is known as the “Power House” of a cell?
 (A) Nucleus (B) Mitochondria
 (C) Endoplasmic Reticulum (D) Peroxisomes
30. Which of the following is the molecular scissors in genetic engineering
 (A) Exonucleases (B) Primase
 (C) Endonucleases (D) DNA ligase

31. Which of the following is a nucleotide sequence database?
 (A) EMBL (B) SWISS PROT (C) PROSITE (D) TREMBL
32. In Sanger's method of DNA sequencing, the growing DNA chains are terminated because
 (A) DNA polymerase is not very processive
 (B) A radioactive nucleotide is incorporated
 (C) The substrates become limiting
 (D) A phosphodiester bond cannot be made
33. Which spectroscopy is used to detect –SH group and disulphide linkages in proteins
 (A) CD spectroscopy (B) Fluorescence spectroscopy
 (C) NMR spectroscopy (D) FTIR spectroscopy
34. The protein component of Rhodopsin molecule is
 (A) 11-cis retinal (B) 11-trans retinal
 (C) Retinene (D) Scotopsin
35. Assembly of 60S and 40S subunits of ribosomes produces
 (A) 80S (B) 70S (C) 50S (D) 100S
36. The property of resonance as applied to protein structure is responsible for
 (A) The prevention of rotation about the alpha carbon
 (B) The planar nature of the peptide bond
 (C) The partial double bond character of the side chain-alpha carbon bond
 (D) The ability of cochlear cells to detect sound waves by mechanotransduction
37. WHAT IS THE NUMBER OF Hydrogen bonds in a B-DNA of 1000 base-pairs with base adenine occurring 75% of the times in one strand and 10% in the other strand?
 (A) 2150 (B) 2820 (C) 2250 (D) 2750
38. Which type of microscope would be best to use if you wanted a 3-Dimensional view of a bacteria cell?
 (A) Compound light microscope (B) Transmission electron microscope
 (C) Scanning electron microscope (D) None of these
39. Which of the following statements is always true for a reaction in which there is no non-expansion work?
 (A) $\Delta U = q_p$ (B) $\Delta H = q_p$ (C) $\Delta U = 0$ (D) $\Delta H = 0$
40. Biological membranes are normally permeable to:
 (A) large, hydrophilic molecules. (B) small, hydrophilic molecules.
 (C) large, hydrophobic molecules. (D) small, hydrophobic molecules.
41. For the separation of DNA by electrophoresis, which of the following method is commonly used?
 (A) Agarose – vertical (B) Agarose – horizontal

- (C) PAGE – vertical (D) PAGE – horizontal

42. When voltage 'V' is applied across a pair of electrode (cathode and anode), a potential gradient 'E' is created between the electrodes. We can calculate 'E' as:

- (A) $E = V/d$ (B) $E = (1/V) \times q$ (C) $E = (Vd)/q$ (D) $E = V + d$

43. NMR is based on:

- (A) Nuclear fission (B) Charge of nucleus
(C) Magnetic moment of the nucleus (D) Electric moment of the nucleus

44. Radioactive substance emits the following rays except:

- (A) Gamma Rays (B) Beta Rays
(C) Alpha rays (D) X-rays

45. A free radical is:

- (A) Any charged particle.
(B) An atom or molecule with an unpaired electron in the outer shell.
(C) An atom with an even number of electrons.
(D) A chemically stable atom.

46. What is the distance between two base pairs in the double helix model of DNA?

- (A) 10Å (B) 0.34mm (C) 5 Å (D) 34mm

47. What is the central dogma?

- (A) DNA→RNA→protein (B) protein→RNA→DNA
(C) DNA→protein→RNA (D) RNA→DNA→protein

48. Antigen binding site of an immunoglobulin are located in:

- (A) Light chain alone (B) Heavy chain alone
(C) F_c region of the antibody (D) F_{ab} region of the antibody

49. The predominant antibody in saliva is:

- (A) IgG (B) IgA (C) IgM (D) IgD

50. Which type of secondary structure is observed in the second quadrant of the Ramachandran plot:

- (A) β -sheet (B) Left handed α -helix
(C) Right handed α -helix (D) Random coil

51. Which of the sequence of atoms can be found in the backbones of polypeptides?

- (A) C-N-N-C (B) C-C-C-N (C) C-C-N-C (D) N-C-C-C

52. Which is the major force of attraction that stabilizes that three-dimensional structure of globular proteins.

- (A) Peptide Bond (B) Van der Waal's interaction
(C) Hydrophobic interaction (D) Hydrogen bond

53. What is the approximate mass of a polypeptide of 400 amino acids?

- (A) 11000 daltons (B) 44000 daltons

- (C) 22000 daltons (D) 88000 daltons
54. Proteins are separated by SDS-electrophoresis on the basis of their
 (A) Size (B) Charge
 (C) Amino acid composition (D) Charge and shape
55. The MALDI spectrum of a peptide shows a peak at m/z corresponding to 3600. When the ESI spectrum is recorded, peaks at m/z corresponding to 721, 904 and 1801 were obtained. When the MALDI MS/MS spectrum was recorded, large number of peaks with m/z less than 3600 were observed. The spectral data indicates that the peptide is
 (A) Highly pure
 (B) Pure with a molecular mass of 3600 and partial sequence of the peptide can be determined
 (C) Highly unstable and degrades rapidly
 (D) Degraded under conditions employed for recording ESI spectrum
56. Assume that an amino acid has no ionizable groups in the side chain and has an isoelectric point at $pH=7$. How is it charged at $pH=2$?
 (A) Negatively (B) Positively
 (C) Neutral overall (D) Dipole
57. Which of the following nuclei will have a magnetic moment?
 (A) $^2D_1$ (B) $^{16}O_8$ (C) $^{12}C_6$ (D) $^{32}S_{16}$
58. Which type of microscope would be best to use if you wanted a 3-Dimensional view of a bacteria cell?
 (A) Compound light microscope (B) Transmission electron microscope
 (C) Scanning electron microscope (D) None of the above
59. Which pair of amino acids will have the highest absorbance at 280nm?
 (A) Thr and His (B) Phe and Pro
 (C) Trp and Tyr (D) Phe and His
60. According to Beer-Lambert's Law, what will be the absorbance when $I = I_0/10$?
 (A) 0 (B) 1 (C) 0.1 (D) 100
61. The most abundant intracellular free nucleotide is:
 (A) FAD^+ (B) ATP (C) NAD^+ (D) $NADP^+$
62. Glucose and mannose are epimers. This means that:
 (A) They are mirror images of each other
 (B) One is an aldose and the other a ketone
 (C) They rotate plane polarized light in opposite directions
 (D) They differ only in the configuration of one carbon atom
63. The greatest amount of glycogen can be found in:
 (A) Liver (B) Kidney

- (C) Skeletal muscle (D) Cardiac muscle
64. The primary thermodynamic factor that favors the formation of a lipid bilayer in aqueous surroundings is
- (A) Hydrogen bond (B) Hydrophobic effect
(C) Ionic interactions (D) Covalent bonds
65. In muscle contraction, what starts filament sliding:
- (A) An increase in Ca^{2+} concentration in the cytosol
(B) A decrease in Na^{+} concentration in the cytosol
(C) The bending of the myosin head
(D) Release of energy from the breakdown of ATP
66. The stress response is controlled primarily by the:
- (A) Kidneys (B) Adrenal glands
(C) Hypothalamus (D) Thyroid gland
67. A person with diabetes mellitus does not secrete enough:
- (A) Sugar (B) Insulin
(C) Glucagons (D) Epinephrine
68. Active immunity means:
- (A) Resistance developed after a disease
(B) Resistance developed before a disease
(C) Increasing rate of heart beat
(D) Increasing quantity of blood
69. In the equation, $A = \epsilon bc$, what quantity is represented by " ϵ "?
- (A) Absorbivity
(B) Molar absorbivity
(C) Path length
(D) Concentration
70. When placed in a magnetic field, all the random spins of the nuclei
- (A) Stop
(B) Reverse direction
(C) Align with the magnetic field
(D) Rotate to 90° away from the induced field
71. Which of the following wavelength ranges is associated with UV spectroscopy?
- (A) $0.8\text{-}500\mu\text{m}$ (B) $400\text{-}100\text{nm}$ (C) $380\text{-}750\text{nm}$ (D) $0.01\text{-}10\text{nm}$
72. Fluid mosaic model of cell membrane was given by:
- (A) Beadle and Tatum (B) Singer and Nicholson
(C) Watson and Crick (D) Robertson and Miller

73. The effect of non-competitive Inhibition on Lineweaver-Burk Plot is that
- (A) It can move the entire curve to the right
 - (B) It can change the y-intercept
 - (C) It can change the x-intercept
 - (D) All of these
74. For each molecule of glucose converted to pyruvate in the glycolytic pathway _____ molecules of ATP are used initially (stage 1) and _____ molecules of ATP are produced (stage 2) for an overall yield of _____ molecules of ATP/glucose.
- (A) $-2 + 4 = 2$
 - (B) $-1 + 4 = 3$
 - (C) $-2 + 5 = 3$
 - (D) $-1 + 2 = 1$
75. SH2 domains specifically bind to
- (A) phosphorylated serine residues
 - (B) phosphorylated tyrosine residues
 - (C) GDP
 - (D) Ca^{2+}

x-x-x

MSc(HS)(Computer Science)

1. The probability that a randomly selected number that is between 100 and 999 (both inclusive) will not contain the digit 7 is
(A) $16/25$ (B) $9/10$
(C) $27/75$ (D) $18/25$
2. Computer instructions written with the use of English words instead of binary machine code is called
(A) Mnemonics (B) Symbolic Code
(C) Gray code (D) Opcode
3. Let S be the standard deviation of n numbers. If each of the 'n' numbers is multiplied by a constant C, then the new standard deviation will be
(A) $C \times S$ (B) S
(C) C (D) S/C
4. The error in using Simpson's rule is of the order
(A) h^2 (B) h^3
(C) h^4 (D) h^5
5. A bag contains 10 white balls and 15 black balls. Two balls are drawn in succession. The probability that one of them is black and the other white is
(A) $2/3$ (B) $4/5$
(C) $1/2$ (D) $1/3$
6. The number of real roots of the equation $|x|^2 - 3|x| + 2 = 0$ is
(A) 1 (B) 2
(C) 3 (D) 4
7. What is the largest 10 digit integer containing all the numerals 1,2,3,4,5,6,7,8,9,0 that is divisible by 4
(A) 9876543210 (B) 987654204
(C) 9876543120 (D) 1234567890
8. Gopal was given an apple and a knife. He was asked to make it into a cube. What is the minimum number of cuts that he needs to make
(A) 4 (B) 6
(C) 8 (D) 12
9. 10 machines can cut 100 papers in 10 minutes. How many papers will be cut by 5 machines in 1 hour?
(A) 200 (B) 300
(C) 400 (D) 500
10. For a game in which two partners oppose two other partners, six men are available. If every possible pair must play against every other pair, the number of games to be played is
(A) 36 (B) 45
(C) 42 (D) 90
11. Which of the following codes needs 7 bits to represent a character?
(A) ASCII (B) HASH

- (C) EBCDIC (D) GRAY
12. Break statement can be simulated by using
 (A) Goto (B) Return
 (C) Exit (D) switch
13. The first operating system used in microprocessors was
 (A) Zenix (B) DOS
 (C) CP/M (D) Multics
14. The binary equivalent of the decimal number 0.4375 is
 (A) 0.0111 (B) 0.1011
 (C) 0.1100 (D) 0.1010
15. Which of the following logic families is well suited for high-speed operation?
 (A) TTL (B) ECL
 (C) MOS (D) CMOS
16. If the cache need an access time of 20 ns and the main memory 120 ns, then the average access time of CPU is (assuming hit ratio to be 80%)
 (A) 30 ns (B) 40 ns
 (C) 35 ns (D) 45 ns
17. # directives must be present
 (A) Before the main() function (B) After the main() function
 (C) At end of program (D) Anywhere in program
18. A list of named integer constants that, once defined, can be used in place of an integer is called an
 (A) Argument (B) Register
 (C) Modifier (D) Enumeration
19. Redundancy is dangerous as it is a potential threat to data
 (A) Consistency (B) Sufficiency
 (C) Integrity (D) (A) and (C)
20. Storage class defines
 (A) The data type (B) The scope
 (C) The scope and permanence (D) Scope, permanence and data type
21. For accessing a structure element using a pointer, we must use
 (A) Dot operator (.) (B) Pointer operator (&)
 (C) Pointer operator (*) (D) Arrow operator (→)
22. CD-ROM is a
 (A) Is a semiconductor memory (B) Memory register
 (C) Magnetic memory (D) Compact disk
23. Any given Boolean expression can be implemented by using

- (A) Only NAND gate (B) Only NOR gates
(C) Only OR gates (D) (A) and (B)
24. Which of the following operator cannot be overloaded?
(A) >> (B) <<
(C) + (D) ?:
25. cout stands for
(A) class output (B) character output
(C) common output (D) call output
26. Which of the following is not a primitive data type?
(A) Boolean (B) Byte
(C) String (D) Double
27. What is the environment variable that contains a list of directories where Java looks for class referenced in a program?
(A) PATHCLASS (B) SEARCHPATH
(C) PATHDIR (D) CLASSPATH
28. Exceptions that are expected to possibly occur are called
(A) Checked exceptions (B) Unchecked exceptions
(C) Errors (D) Runtime exceptions
29. The order of the binary search algorithm is
(A) n (B) n^2
(C) $n \log(n)$ (D) $\log(n)$
30. A hash table has space for 100 records. What is the probability of collision before the table is 10% full?
(A) 0.45 (B) 0.5
(C) 0.3 (D) 0.65
31. Merge sort uses
(A) Divide and conquer strategy (B) Backtracking approach
(C) Heuristic approach (D) Greedy approach
32. Virtual memory is
(A) An extremely large main memory (B) An extremely large secondary memory
(C) An illusion of an extremely large memory (D) Type of memory used in super computers
33. Semaphores are used to solve the problem of
(A) Race condition (B) Process synchronization
(C) Mutual exclusion (D) Both (B) and (C)
34. The first-fit, best-fit and worst-fit algorithms can be used for
(A) contiguous allocation of memory (B) linked allocation of memory
(C) indexed allocation of memory (D) can't be used

35. Suppose that a process is in 'BLOCKED' state waiting for some 'IO' service. When the service is completed, it goes to the
- (A) Running state (B) Ready state
(C) Suspended state (D) Terminated state
36. Which of the following page replacement algorithms suffers from Belady's anomaly?
- (A) FIFO (B) Optimal
(C) LRU (D) Both (A) and (B)
37. Memory protection is generally done by the
- (A) Operating system (B) Processor and the associated hardware
(C) Compiler (D) (A) and (B)
38. Thrashing
- (A) Implies excessive page I/O (B) Reduces page I/O
(C) Decreases the degree of multiprogramming (D) Improves system performance
39. Which normal form is considered adequate for relational database design?
- (A) 3 NF (B) 2 NF
(C) 4 NF (D) BCNF
40. The column of a table is referred to as
- (A) Tuple (B) Attribute
(C) Entity (D) Degree
41. E-R modeling technique is a
- (A) Top-down approach (B) Bottom-up approach
(C) Left-right approach (D) Right-left approach
42. An attribute of one table matching the primary key of another table is called as
- (A) Secondary key (B) Foreign key
(C) Candidate key (D) Composite key
43. The entity integrity constraint states that no primary key value can be
- (A) Zero (B) Null
(C) One (D) Two
44. The topology with highest reliability is
- (A) Bus topology (B) Star topology
(C) Ring topology (D) Mesh topology
45. Which of the following ISO level is more closely related to the physical communication facilities?
- (A) Application (B) Data Link
(C) Session (D) Network
46. Which of the following transport layer protocols is used to support electronic mail?
- (A) SMTP (B) TCP
(C) IP (D) UDP
47. ISP stands for
- (A) Internal Service Provider (B) Indian Service Provider
(C) Internet Service Provider (D) Internet Service Prover

48. Transfer of information to and from the main memory takes place in terms of
 (A) Bits (B) Words
 (C) Bytes (D) Nibbles
49. Which of the following system software always resides in the main memory?
 (A) Text Editor (B) Assembler
 (C) Linker (D) Loader
50. The correct sequence of time delays that happen during a data transfer from a disk to memory is
 (A) Seek time, latency time and transfer time (B) Seek time, access time and transfer time
 (C) Latency time, seek time and transfer time (D) Latency time, access time and transfer time
51. In a two-pass assembler the object code generation is done during the
 (A) Second pass (B) First pass
 (C) Zeroeth pass (D) Third pass
52. The phenomenon of having a continuous glow of a beam on the screen even after it is removed is called as
 (A) Fluorescence (B) Persistence
 (C) Incandescence (D) Phosphorescence
53. The clarity of a displayed image depends on the
 (A) Resolution (B) Floating point precision of the system
 (C) Associated software (D) All three
54. Microprocessors can be used to make
 (A) Computer (B) Digital systems
 (C) Calculator (D) All of these
55. A circle, if scaled in only one dimension, becomes a/an
 (A) Parabola (B) Ellipse
 (C) Hyperbola (D) Remains a circle
56. UNIX was developed by
 (A) Bell Labs (B) Berkley software group
 (C) California University (D) American Defence Academy
57. Heap allocation is required for languages that
 (A) Support recursion (B) Support dynamic data structures
 (C) Use dynamic scope rules (D) (A) and (C) both
58. A function that supports the same operation on different data types is implemented using
 (A) Macros (B) Overloading
 (C) Function templates (D) Default arguments

59. Software testing techniques are most effective if applied immediately after
 (A) Requirement specification (B) Coding
 (C) Design (D) Deployment
60. Which of the following sorting algorithms is the best?
 (A) Merge sort (B) Bubble sort
 (C) Quick sort (D) Selection sort
61. Error detection at data link level is achieved by
 (A) Bit stuffing (B) Cyclic redundancy codes
 (C) Hamming codes (D) Equalization
62. The length of the longest pole that can be made inside a hall of 18-m length, 6-m breadth and 4.5-m height is
 (A) 17.5 m (B) 20.25 m
 (C) 20 m (D) 19.5 m
63. The output quality of a printer is measured by
 (A) Dots per Foot inch (B) Dots per inch
 (C) Dots printed per unit of time (D) Resolution of the screen
64. Negative numbers cannot be represented in
 (A) Unsigned binary representation (B) Signed magnitude form
 (C) 2's complement form (D) 1's complement form
65. The expression $4 + 6/3 * 2 - 2 + 7 \% 3$ evaluates to
 (A) 7 (B) 3
 (C) 6 (D) 4
66. Puts (argv [0]);
 (A) Prints the name of source code file (B) Prints argv
 (C) Prints the number of command line arguments (D) Prints the name of the executable code file
67. Let x be an array. Which of the following operations are illegal?
 (A) ++x (B) x + 1
 (C) x++ (D) all of these
68. Which of the following cannot be declared as static?
 (A) Class (B) Object
 (C) Functions (D) (A) and (B) both
69. Garbage collector frees the programmer from worrying about
 (A) Memory leaks (B) Dangling references
 (C) Creating new objects (D) Recursion
70. Personnel who design, program, operate and maintain computer equipment refers to
 (A) Console-operator (B) Programmer
 (C) Peopleware (D) System Analyst
71. Which of the following is not desired in a good Software Requirement Specification document?
 (A) Functional requirements (B) Non-functional requirements

(C) Algorithms for software
implementation

(D) User Requirements

72. The maximum degree of any vertex in a simple graph with n vertices is

(A) n

(B) $n-1$

(C) $2n-1$

(D) $n+1$

73. The extent to which the software can continue to operate correctly despite of the introduction of invalid input is called as

(A) Reliability

(B) Robustness

(C) Consistency

(D) Portability

74. In object oriented design of the software, objects have

(A) Attributes and name only

(B) Operations and name only

(C) Attributes, name and operations

(D) Attributes and operations only

75. What are the types of lists available in HTML?

(A) Ordered and unordered

(B) Bulleted and numbered

(C) Named and unnamed

(D) All of these

$x-x-x$

MSc(HS)(Physics/Medical Physics/Specialisation in Electronics)

1. Two particles each of rest mass 'm' collide head on and stick together. Before collision, the speed of each mass was 0.6 times the speed of light in free space. Mass of final entity is
(A) 2m (B) 5m/2 (C) 25m/8 (D) 5m/4
2. The average of the function $f(x) = \sin x$ in the interval $(0, \pi)$ is
(A) $2/\pi$ (B) $4/\pi$ (C) $1/\pi$ (D) $1/2$
3. $x^y = e^{x-y}$ is equal to
(A) $x/[(1+\log x)^2]$ (B) $y/[(1+\log x)^2]$ (C) $y/[(1-\log x)^2]$ (D) $\log x/[(1+\log x)^2]$
4. If $x = 3 \cos \theta - \cos^3 \theta$ and $y = 3 \sin \theta - \sin^3 \theta$, then dy/dx is equal to
(A) $-\tan^2 \theta$ (B) $\tan^2 \theta$ (C) $-\cos^3 \theta$ (D) $\cos^3 \theta$
5. If the radius of the earth is to decrease by 1%, what would be the approximate change in acceleration due to gravity?
(A) increase by 1% (B) increase by 2% (C) decrease by 1% (D) decrease by 2%
6. A spring oscillating in water is acted upon by an external force $B \cos \omega t$. With the passage of time, the frequency of the spring tends to be
(A) decreasing exponentially (B) equal to ω
(C) greater than ω (D) less than ω
7. A gun shoots three times as high when its angles of elevation is γ cm when it is β . What is the ratio of the horizontal distance travelled respectively in the two cases?
(A) 2:1 (B) 1:3 (C) 1:1 (D) 3:1
8. In low density oxygen gas at low temperature, only the translation and rotational modes of molecular are excited. The specific heat per molecules of the gas is
(A) $(-3/2)k_B$ (B) $(-5/2)k_B$ (C) k_B (D) $(1/2)k_B$
9. An inertial frame of reference B is moving along the x-axis with a velocity 9×10^6 m/s with respect to another inertial frame A. A rod is located in the frame A with its two ends at the coordinate points (5, -5, 0) B is
(A) 13.5 m (B) 12.5 m (C) 13.0 m (D) 14.0 m
10. Consider the head-on elastic collision of a neutron moving respectively through a sample of lead, carbon, paraffin and tin. Which one of the above samples is most efficient in slowing down the neutron?
(A) Tin (B) Paraffin (C) Carbon (D) Lead
11. The longitudinal vibrations of a fixed frequency bar gives
(A) Even harmonics (B) Odd harmonics
(C) Both odd and even harmonics (D) Overtones
12. The reaction $e^+ + e^- \rightarrow \gamma$ is forbidden because

- (A) angular momentum is not conserved (B) charge is not conserved
(C) lepton number is not conserved (D) linear momentum is not conserved

13. The number of beats produced in one second is equal to the
(A) square of the sum of the frequencies of the two nodes
(B) difference of the frequencies of two nodes
(C) sum of the frequencies of two nodes
(D) product of the frequencies of two nodes
14. A passenger is sitting in a bus, which is moving very fast. The driver of the bus makes a horn of frequency ' n_1 '. If the apparent frequency of the sound heard by the passenger is ' n_2 ' then
(A) $n_2 < n_1$ (B) $n_2 = n_1$ (C) $2n_2 > 2n_1$ (D) $n_2 < 2n_1$
15. Two closed organ pipes when sounded together produced 12 beats in 4s at a temperature of 27°C . Find the temperature at which number of beats produced are sixteen during the same period.
(A) 200°C (B) 250°C (C) 360.3°C (D) 260.3°C
16. The relativistic transformation refers to
(A) Newtonian transformations (B) Galilean transformations
(C) Lorentz transformations (D) Einsteinian transformations
17. A railway engine passes by the platform at a speed of 36 km/h, blowing its whistle having a frequency of 660 Hz. The difference in the frequencies of the whistle heard by a person standing on the platform as the engine goes past the persons is equal to
(A) 40 Hz (B) 60 Hz (C) 80 Hz (D) 20 Hz
18. In the case of forced vibration of resonance wave becomes very sharp when the
(A) damping force is small (B) quality factor is small
(C) restoring force is small (D) applied oscillatory force is small
19. A telescope has an objective lens of 10 cm diameter and is situated at a distance 1 km from two objects. The minimum distance between these two objects, which can be resolved by the telescope, when the mean wavelength of the light is $5000 \text{ \AA}$ is of the order
(A) 5 m (B) 5 cm (C) 2.5 cm (D) 5 mm
20. The objective of an astronomical telescope has a large aperture to
(A) have high resolution (B) have low resolution
(C) increase span of observation (D) reduce spherical aberration
21. A beam of light of frequency ω is reflected from a dielectric-metal interface at normal incidence. The refractive index of the dielectric medium is ' n ' and that of the metal is $n_2 = n(1 + ip)$. If the beam is polarised parallel to the interface, then the phase change experienced by the light upon reflection is

- (A) $\tan^{-1}(2\rho)$ (B) $\tan^{-1}(2/\rho)$ (C) $\tan^{-1}(1/\rho)$ (D) $\tan(2\rho)$
22. A rectangular tank of 6 m deep is full of water. By how much does the tank appear to be raised? (Refractive index of water = 1.33)
 (A) 6 m (B) 4 m (C) 1.5 m (D) 3 cm
23. Which laser is used for removing unwanted hair from the skin?
 (A) Ruby laser (B) He-Ne laser (C) CO₂ laser (D) Nd-YAG laser
24. Polarization of light by reflection from the surface of glass was discovered by
 (A) Malus in 1808 (B) Malus in 1811 (C) Brwester in 1811 (D) Brewster in 1808
25. The angular width of central bright maximum in the Fraunhofer's diffraction pattern of a slit of width 12×10^{-5} cm, when the slit is illuminated by monochromatic light of wavelength 6000 Å, is
 (A) 7.5° (B) 30° (C) 45° (D) 60°
26. Twelve equal resistances each of 2 ohm from the edges of a cube. If a 2 volt battery having internal resistance 0.1 ohm is connected between two adjacent corners of a cube, then the current (in Amp.) drawn from battery is
 (A) 29/20 (B) 20/29 (C) 30/19 (D) 60/53
27. An alpha particle moving in a circular orbit of radius 'a' makes 'n' revolutions. The magnetic moment produced at the centre is 'B'. The magnetic moment associated with alpha particle 'M' is
 (A) $2\pi\pi ea^2$ (B) πea^2 (C) $(1/2)\pi ea^2$ (D) $2\pi ea^2$
28. A plane electromagnetic wave $E_2 = 100 \cos(6 \times 10^8 t + 4x)$ V/m propagates in a medium of dielectric constant
 (A) 2.0 (B) 2.4 (C) 4.0 (D) 1.5
29. In voltage divider bias, $V_{CC} = 25$ V; $R_1 = 10$ kΩ; $R_2 = 2.2$ kΩ; $R_C = 3.6$ kΩ and $R_E = 1$ kΩ. The emitter voltage will be
 (A) 5.3 V (B) 3.8 V (C) 6.7 V (D) 4.9 V
30. Current of 16 A is passed through a conductor with an electron density of $4 \times 10^{28} \text{ m}^{-3}$ and area of cross-section 10^{-5} m^2 . Average drift velocity of free electrons in the conductor is
 (A) $2.5 \times 10^{-4} \text{ m/s}$ (B) $6.4 \times 10^{-4} \text{ m/s}$ (C) $1.6 \times 10^{-4} \text{ m/s}$ (D) $3.2 \times 10^{-4} \text{ m/s}$
31. Reactance of a capacitor of $1/\pi$ farad at 50 Hz is
 (A) 10^{-2} ohm (B) 10 ohm (C) 50 ohm (D) 100 ohm
32. A proton of energy 1 MeV moves in a uniform magnetic field along a circular path. The energy for an alpha particle to circulate along the same orbit in the same magnetic field is
 (A) 4 MeV (B) 3 MeV (C) 2 MeV (D) 1 MeV

33. If the frequency is 60 Hz, then the capacitance of a capacitor, which must be connected in series with a resistance of 5 ohm and inductance of 200 mH to bring the current in phase with voltage will be
 (A) 40.4 μF (B) 35.2 μF (C) 32 μF (D) 30.2 μF
34. Which of the following statement is true?
 (A) the triple point of water is 273.16 K
 (B) the triple point of CO_2 is 216.55 K
 (C) when solid CO_2 is exposed to 1atm pressure, it gets transformed into vapour directly
 (D) all of the mentioned
35. A Carnot heat pump is used to heat a house. The outside temperature is -3°C and the indoor temperature is 27°C . If the heat loss from the house is 40kW, the power required to operate the heat pump is?
 (A) 4 kW (B) 3 kW (C) 2 kW (D) 1 kW
36. What is the relationship between Kelvin-Planck's and Clausius' statements?
 (A) violation of one doesn't violate the other
 (B) not connected to each other
 (C) virtually two parallel statements of the second law
 (D) connected to each other
37. Van der Waal's equation of state of a gas takes into account
 (A) velocity of the molecules only (B) intermolecular force only
 (C) size of the molecule only (D) both (B) and (C) are true
38. Helmholtz free energy never increases during a process which is
 (A) Isochoric (B) Isothermal
 (C) Isothermal and Isochoric (D) Isothermal and Isobaric
39. If the ratio of the RMS speed and the mass of the molecule of gas A to gas B 1:2 and 2:1 respectively, then find the ratio of the temperature of the gas A to gas B.
 (A) 1:4 (B) 1:2 (C) 1:8 (D) 2:1
40. An area inside the Carnot cycle represents
 (A) heat losses or energy losses during the cycle
 (B) heat rejected by the system to the sink
 (C) heat taken by the working substance from the source
 (D) the net work done
41. A large ice-berg melts
 (A) more at the middle section (B) more at the top
 (C) an entire exposed surface uniformly (D) more at the base
42. The rectangular surface of area 8 cm x 4 cm of black body at a temperature of 127°C emits energy at the rate of E per second. If the length and breadth of the surface are each reduced to half of its initial value and the temperature is raised to 327°C , the rate of emission of energy will become
 (A) $9/16 E$ (B) $81/64 E$ (C) $3/8 E$ (D) $81/16 E$

43. The variation of photoelectric current given by the photocell with the intensity of light, is given by a graph, which is a straight line with
 (A) -ve slope passing through origin (B) +ve slope passing through origin
 (C) -ve slope with intercept of current axis (D) +ve slope with intercept of current axis
44. If the uncertainty in the position of an electron is 10^{-10} m, then the value of uncertainty in its momentum (in Kg m/s) will be
 (A) 6.6×10^{-26} (B) 6.6×10^{-24} (C) 1.03×10^{-24} (D) 3.33×10^{-24}
45. Ultraviolet radiation of 6.2 eV falls on an aluminium surface (work function = 4.2 eV). The K.E. in Joules of the fastest electron emitted is approximately
 (A) 3.2×10^{-19} (B) 3.2×10^{-15} (C) 3.2×10^{-17} (D) 3.2×10^{-21}
46. A direct X-ray photograph of the intestines is not generally taken by the radiologists because
 (A) Intestines will burst on exposure to X-rays
 (B) The X-rays will not pass through the intestines
 (C) The X-rays will pass through the intestines without causing a good shadow for any useful diagnosis
 (D) A very small exposure of X-rays causes cancer in the intestines
47. A photon of energy 8 eV is incident on a metal surface of threshold frequency 1.6×10^{15} Hz. The K.E. of the photoelectrons emitted is (in eV) (given $h = 6 \times 10^{-34}$ Js):
 (A) 1.2 (B) 1.6 (C) 2 (D) 6
48. A particle has a total energy that is less than that of a potential barrier. When the particle penetrates the barrier, its wave function is
 (A) oscillatory (B) a positive constant
 (C) exponentially increasing (D) exponentially decreasing
49. A physically reasonable wave function, $\psi(x)$, for a one-dimensional system must
 (A) be single-valued (B) be continuous at all points in space
 (C) be defined at all points in space (D) obey all the constraints listed above
50. The wave function $\psi(x)$ of a particle confined to $0 \leq x \leq L$ is given by $\psi(x) = Ax$. $\psi(x) = 0$ for $x < 0$. When the wave function is normalized, the probability density at coordinate x has the value
 (A) $(3/L^3)x^3$ (B) $(3/L^3)x^2$ (C) $(2/L^2)x^2$ (D) $(2/L^2)x$
51. The energy released during the fission of U-235 into Barium and Krypton is about 200 MeV. This energy is equivalent to mass defect approximately:
 (A) 931 amu (B) 2.25×10^{-15} amu (C) 0.215 amu (D) 166×10^{-27} amu
52. Which of the following pair is NOT correctly matched
 (A) Proton – Baryon (B) Neutrino – Lepton
 (C) Lambda – Meson (D) Pion – Meson
53. The half-life of radium is about 1600 years. Of 100 gm radium existing now, 25 gm will remain unchanged after
 (A) 3200 years (B) 6400 years (C) 2400 years (D) 4800 years

54. In Compton scattering the incident photon loses maximum energy to the electron when the photon is scattered at
 (A) 90° (B) 45° (C) 0° (D) 180°
55. The ionisation energy of hydrogen atom is 13.6 eV. The ionisation energy of helium atom would be
 (A) 54.4 (B) 27.2 eV (C) 13.6 eV (D) 6.8 eV
56. The frequency of the radiation emitted by a hydrogen atom for the transition between $n=2$ and $n=1$ states is ν_0 . What is the frequency of the radiation emitted by the hydrogen atom for transition between $n=4$ and $n=1$ states?
 (A) $2\nu_0$ (B) $4\nu_0$ (C) $5\nu_0/4$ (D) $3\nu_0/4$
57. The shortest wavelength in Lyman series of hydrogen spectra is 91.2 nm, the longest wavelength in this series must be
 (A) 243.2 nm (B) 182.4 nm (C) 364.8 nm (D) 121.6 nm
58. Mostly crystals show good cleavage because their atoms, ions or molecules are
 (A) spherical symmetrical (B) arranged in planes
 (C) strongly bonded together (D) weakly bonded together
59. An example of a body centred cube is
 (A) nickel (B) aluminium (C) sodium (D) copper
60. Which type of solid crystals will conduct heat and electricity?
 (A) metallic (B) molecular (C) covalent (D) ionic
61. When BCC iron is heated, it changes to FCC iron resulting in
 (A) contraction in volume (B) increase in volume
 (C) no change in volume (D) crack in the material
62. Which metal among the following has the highest packing efficiency?
 (A) Polonium (B) Aluminium (C) Iron (D) Tungsten
63. In orthorhombic, the value of a , b , c are respectively 4.2 $\text{\AA}$, 8.6 $\text{\AA}$ and 8.3 $\text{\AA}$. The molecular mass of the solute is 15 gm mol^{-1} and density is 3.3 gm/cc , the number of formula units per unit cell is
 (A) 3 (B) 2 (C) 4 (D) 6
64. CsBr crystal has bcc structure. It has edge length of 4.3 $\text{\AA}$. The shortest interionic distance between Cs^+ and Br^- ions is
 (A) 3.72 $\text{\AA}$ (B) 4.3 $\text{\AA}$ (C) 1.86 $\text{\AA}$ (D) 7.44 $\text{\AA}$
65. The number of unit cells in 58.5 gm of NaCl is nearly
 (A) 5×10^{25} (B) 1.5×10^{23} (C) 6×10^{20} (D) 3×10^{22}
66. In which of the following a CPU can execute a program?
 (A) in hexadecimal number (B) in symbolic language
 (C) in binary (D) in assembly language
67. In Boolean algebra, $y = A.B$ implies

- (A) y equals A or B (B) y equals A and B
(C) y equals neither A nor B (D) y equals product of A and B
68. Which of the following is not an acceptor impurity?
(A) Indium (B) Boron (C) Gallium (D) Arsenic
69. Where is the velocity of electrons maximum in diode?
(A) in the space between the two electrode (B) it is the same throughout the tube
(C) near the cathode (D) near the anode
70. A transistor is used in common emitter mode as an amplifier. Then
(A) the input signal is connected in series with the voltage applied to the base-emitter junction
(B) the base-emitter junction is forward biased
(C) the base-emitter junction is reverse biased
(D) both (A) and (B)
71. Under space charge limited conditions, 10 mA is the plate current of a diode for a given plate potential. When its potential is made 4 times, the plate current will be
(A) 160 mA (B) 80 mA (C) 40 mA (D) 20 mA
72. The probability of finding electrons in the conduction band of an intrinsic semiconductor at a finite temperature
(A) decreases with increasing temperature
(B) is independent of the temperature and band gap
(C) increases exponentially with increasing band gap
(D) decreases exponentially with increasing band gap
73. A glass plate of refractive index $n = 1.5$ and thickness 30 mm is placed just below a well-focussed microscope. For focussing it again, the microscope should be moved through a distance of
(A) 15 mm (B) 20 mm (C) 30 mm (D) 45 mm
74. When excited by light of wavelength $4358 \text{ \AA}$, a transparent substance produces stokes Raman frequency shift of 458 cm^{-1} . The wavelength of the anti-stokes line is
(A) $4274 \text{ \AA}$ (B) $4448 \text{ \AA}$ (C) $4548 \text{ \AA}$ (D) $4058 \text{ \AA}$
75. The device associated with voltage controlled capacitance is a
(A) zener diode (B) varactor diode (C) photo-diode (D) LED

x-x-x

MSc(2Yr)(Bioinformatics/System Bio. & Bio.Informatics)

1. The transformation of cartilage into bone is called
(A) Osteoporosis (B) Haemopoiesis (C) Ossification (D) Haemolysis
2. Hamburger's phenomenon is also called
(A) bicarbonate shift (B) chloride shift (C) sodium shift (D) none of these
3. Hair of bat and feathers of pigeon are
(A) homologous structures (B) analogous structures
(C) both (A) and (B) (D) integumentary derivatives
4. Excessive reabsorption of vitamin A by bone leads to
(A) keratomalacia (B) hypercalcaemia (C) hyperkeratosis (D) beriberi
5. Deficiency of parathormone in the blood causes
(A) Hypokalemia (B) hyperkalemia (C) hypocalcemia (D) hypercalcaemia
6. Vitamin excreted in urine by higher vertebrates is
(A) A (B) B (C) K (D) C
7. Corpus callosum of the brain connects
(A) optic chiasma (B) two cerebral hemispheres
(C) two olfactory lobes (D) two optic lobes
8. Polysome is a chain of
(A) oxysomes (B) sphaerosomes (C) ribosomes (D) dictyosomes
9. In a food-chain, the saprophytic organisms are
(A) producers (B) consumers (C) predators (D) decomposers
10. Which of the following evidences does not favour the Lamarckian concept of inheritance of acquired characters?
(A) lack of pigment in cave-dwelling animals
(B) melanization in peppered moth
(C) absence of limbs in snakes
(D) presence of webbed toes in aquatic birds
11. Decinormal solution of acetic acid ionised to an extent of 1.3%. pH of this solution will be ($\log 1.3 = 0.11$)
(A) 3.89 (B) 2.89 (C) 4 (D) 1.0
12. The chemical system in equilibrium is not affected by
(A) change in the concentration of products
(B) increase in the concentration of reactants
(C) addition of a catalyst
(D) changing the temperature
13. The highest temperature at which vapour pressure of a liquid can be measured is...
(A) the boiling point of the liquid (B) critical solution temperature
(C) ionisation temperature (D) inversion temperature
14. Ethyl alcohol is

- (A) a deliquescent substance (B) an efflorescent substance
(C) a hygroscopic substance (D) a dehydrating substance
15. The most abundant noble gas present in air is
(A) neon (B) argon (C) helium (D) krypton
16. Temporary hardness is due to the presence of
(A) calcium carbonate (B) calcium bicarbonate
(C) magnesium sulphate (D) calcium sulphate
17. The term anomers of glucose refers to
(A) isomers of glucose that differ in configurations at carbons one and four (C-1 & C-4)
(B) a mixture of (D)-glucose and (L)-glucose
(C) enantiomers of glucose
(D) isomers of glucose that differ in configuration at carbon one (C-1)
18. The highest electrical conductivity of the following aqueous solutions is of
(A) 0.1 M acetic acid (B) 0.1 M chloroacetic acid
(C) 0.1 M fluoroacetic acid (D) 0.1 M difluoroacetic acid
19. The number and type of bonds between two carbon atoms in calcium carbide are
(A) One sigma, one pi (B) One sigma, two pi
(C) Two sigma, one pi (D) Two sigma, two pi
20. The complex compounds which result from the coordination of carbon monoxide are known as
(A) Electronic (B) Carbonyls (C) Carbonates (D) Carbon permono
21. Waves which require medium for propagation are
(A) electromagnetic (B) mechanical (C) transverse (D) longitudinal
22. The movement of water across a selectively permeable barrier is known as
(A) Diffusion (B) Bulk flow (C) Osmosis (D) None of these
23. Laser light is considered to be coherent because it consists of
(A) many wavelengths (B) uncoordinated wavelengths
(C) coordinated wavelengths (D) divergent waves
24. A phase difference π between two interfering beams is equivalent to the path difference
(A) λ (B) $\lambda/2$ (C) $\lambda/3$ (D) $\lambda/4$
25. Hydrogen atom doesn't emit x-rays because
(A) energy levels are close (B) energy levels are far
(C) it has small mass (D) it has single electron
26. Ballmer series in the region of electromagnetic spectrum is in
(A) infrared region (B) ultraviolet region
(C) visible region (D) x-ray region
27. When a pure semiconductor is heated, its resistance....
(A) Goes up (B) Goes down (C) Remains the same (D) Can't say

28. In the depletion region of a pn junction, there is a shortage of
 (A) Acceptor ions (B) Holes and electrons
 (C) Donor ions (D) None of these
29. Activity of one decay per second is equal to
 (A) 1 Bq (B) 1 atm (C) 1 mol (D) 1 Cd
30. In gamma emission, the change in nucleon number is
 (A) zero (B) definite (C) increase by 1 (D) decreases by 1
31. The mutual attraction between water molecules is called
 (A) Cohesion (B) Adhesion (C) Dielectric constant (D) Capillarity
32. OMIM is.
 (A) Online Model of Inheritance in Man (B) Online Molecular Inheritance in Man
 (C) Online Mendelian Inheritance in Man (D) Online Minimal Inheritance in Man
33. Which of the following is not a file format
 (A) ASN.1 (B) OMIM (C) Fasta (D) Flat file
34. Which of the following is a sequence retrieval system
 (A) PDB (B) Entrez (C) Genbank (D) DDBJ
35. PAM is
 (A) Point added mutation (B) Point accepted mutation
 (C) Paired accepted mutation (D) Paired acquired mutation
36. Which form of BLAST searches a protein sequence against translated nucleotide sequence in the database
 (A) BLASTp (B) tBLASTn (C) BLASTn (D) tBLASTx
37. Which of following is a multiple sequence alignment tool
 (A) BLAST (B) FASTA (C) Clustal W (D) BLOSUM
38. Which of these gastric secretory cells secrete HCl
 (A) Chief cells (B) Parietal cells (C) Mucous cells (D) G cells
39. Insulin is secreted by
 (A) Alpha cells (B) Beta cells (C) Gamma cells (D) All of these
40. Specialized phagocytic macrophages present in liver are
 (A) Hepatocytes (B) Kupffer cells (C) Chief cells (D) G cells
41. Which of the following organelle is involved in the synthesis of the cell wall?
 (A) Mitochondria (B) Chloroplast (C) Lysosome (D) Golgi apparatus
42. Photo oxidation of water in photosynthesis is in association of
 (A) Cytochrome B6 (B) Pigment system – I
 (C) Pigment system - II (D) Plastocyanin
43. Gibberellins promote
 (A) seed germination (B) seed dormancy (C) leaf fall (D) root elongation
44. Minerals absorbed by root move to the leaf through

- (A) xylem (B) phloem (C) sieve tubes (D) none of these
45. In C4 plants, Calvin cycle operates in
 (A) stroma of bundle sheath chloroplasts (B) grana of bundle sheath chloroplasts
 (C) grana of mesophyll chloroplasts (D) stroma of mesophyll chloroplasts
46. When the plants are grown in magnesium deficient but urea rich soil, the symptoms expressed are
 (A) yellowish leaves (B) colourless petiole
 (C) dark green leaves (D) shoot apex die
47. Which aquatic fern performs nitrogen fixation?
 (A) Azolla (B) Nostoc (C) Salvia (D) Salvinia
48. Seed dormancy is due to the
 (A) ethylene (B) abscisic acid (C) IAA (D) Starch
49. Which one of the following is not a major characteristic feature of biodiversity hot spots?
 (A) Large number of species (B) Abundance of endemic species
 (C) Large number of exotic species (D) Destruction of habitat
50. Which one of the following is an endangered plant species of India?
 (A) Rauwolfiaserpentina (B) Santalum album (Sandal wood)
 (C) Cycasbeddonei (D) All of these
51. The diffusion of water directly across the lipid bilayer is facilitated by
 (A) Lipids (B) Aquaporins (C) Carbohydrates (D) None of these
52. The units of water potential in the plant cells are
 (A) MPa (B) Da (C) Kg (D) KDa
53. In Apoplast pathway, water moves through
 (A) Cytoplasm (B) Cell wall (C) Cytosol (D) Plasma membrane
54. Guard cells are present in
 (A) Stomatal pore (B) Phloem (C) Xylem (D) Roots
55. Root nodules of nitrogen fixing plants contain
 (A) Hemoglobin (B) Myoglobin (C) Leghemoglobin (D) Myelin
56. Solute translocation in the phloem is
 (A) An active process (B) Very fast process
 (C) A passive process (D) All of these
57. Z-scheme of photosynthesis consists of
 (A) P680 (B) Plastocyanin (C) P700 (D) All of these
58. Artificial ripening of fruits is done by
 (A) Auxins (B) Gibberelins (C) Cytokinins (D) Ethylene

59. Suppose a white-furred rabbit breeds with a black-furred rabbit and all of their offspring have a phenotype of gray fur. What does the gene for fur color in rabbits appear to be an example of?
- (A) Incomplete dominance (B) Mosaicism
(C) Complete dominance (D) None of these
60. In the ABO blood group system in humans, if a person of type-B blood has children with a person of type-AB blood, what blood types could their children have?
- (A) O (B) A, B, AB (C) A (D) A, B, O, AB
61. Alleles are
- (A) Linked genes (B) Homologous chromosomes
(C) Alternative forms of gene (D) Chromosomes that have crossed over
62. When a heterozygous offspring is crossed with homozygous recessive parent, it is called
- (A) Monohybrid cross (B) Test cross
(C) Dihybrid cross (D) Interspecific cross
63. All of these obey Mendel's laws except
- (A) Independent assortment (B) Dominance
(C) Linkage (D) Purity of gametes
64. Crossing over is responsible for
- (A) Recombination (B) Segregation
(C) Dominance (D) Linkage
65. LeschNyhan syndrome is caused by
- (A) Deficiency of biotin (B) Deficiency of HGPRTase activity
(C) Deficiency of vitamin C (D) Deficiency of collagenase activity
66. Which of the following is a CAG triplet repeat disorder
- (A) Alzheimer's disease (B) Parkinson's disease
(C) Huntington's disease (D) Cystic fibrosis
67. Which of the following is a Mendelian disorder
- (A) Phenylketonuria (B) Down's syndrome
(C) Klinefelter's syndrome (D) Turner's syndrome
68. Linkage prevents
- (A) Hybrid formation (B) Homozygous condition
(C) Heterozygous condition (D) Segregation of alleles
69. A rule for determining the desirable number of groups into which a distribution of observations should be classified is
- (A) Sturges rule (B) Lipinski rule (C) Bonferroni rule (D) None of these
70. A characteristic based on which a population can be described in to categories is called
- (A) Parameter (B) Statistic (C) Attribute (D) None of these

71. Which of the following is used to measure the degree of flatness of the shape of data
 (A) Skewness (B) Kurtosis (C) Standard deviation (D) All of these
72. Which of the following tests are parametric tests:
 (A) ANOVA (B) Wilcoxon (C) Kruskal-Wallis (D) None of these
73. The Student's t test is:
 (A) a parametric test (B) a nonparametric test
 (C) a test for comparing averages (D) both A and C
74. Standard deviation is
 (A) square root of variance
 (B) measure of spread of data
 (C) average distance of data points from their mean
 (D) all of these
75. An inferential statistic used to assess the equality of variances for a variable calculated for two or more groups
 (A) Levene's test (B) LSD test (C) Bonferroni test (D) None of these

$\bar{x} - \bar{x} - \bar{x}$

MSc(2Yr)(Environment Science)

1. Which of the following is a 'flagship environmental policy' of the Government of India that focuses on sustainable development?
(A) Western Ghat Development Mission
(B) National Action Plan on Climate Change
(C) National Education Policy
(D) Interlinking of Rivers
2. Which of the following is an example of point source pollution?
(A) Industrial discharge
(B) Agricultural runoff
(C) Urban runoff
(D) Automobile emissions
3. Which of the following is the heaviest noble gas?
(A) Xenon
(B) Krypton
(C) Argon
(D) Radon
4. Which of the following is NOT a characteristic of a food chain?
(A) It shows the transfer of energy and nutrients from one trophic level to another
(B) It always starts with a producer organism
(C) It can have multiple levels
(D) It shows the interaction between living and non-living components of an ecosystem
5. Which ethical principle refers to the responsible use and protection of the [natural environment](#) through active participation in [conservation](#) efforts and [sustainable](#) practices by individuals, small groups, non-profit organizations, federal agencies, and other collective networks?
(A) Inter-generational Equity
(B) Environmental Justice
(C) Environmental Stewardship
(D) Environmental Rights
6. Which of the following is a type of groundwater deposit formed by the precipitation of minerals from solution around the openings of caves?
(A) Karst
(B) Aquifer
(C) Artesian well
(D) Spring
7. Which of the following is a process used for the separation of a mixture of compounds based on their boiling points?
(A) Filtration
(B) Fractional Distillation
(C) Chromatography
(D) Crystallization
8. Which of the following is a theoretical perspective in sociology that emphasizes the importance of social structure and institutions in shaping human behaviour?
(A) Symbolic interactionism
(B) Functionalism
(C) Feminist theory
(D) Conflict theory

9. Which of the following is a common laboratory solvent used for the purification of organic compounds?
(A) Ethanol (B) Acetic acid (C) Diethyl ether (D) Sodium hydroxide
10. Which of the following laws relates the pressure, volume, and temperature of a gas?
(A) Newton's laws (B) Boyle's law (C) Coulomb's law (D) Ohm's law
11. Which of the following is NOT a component of an ecosystem?
(A) Biotic component (B) Abiotic component
(C) Social component (D) Energy component
12. Which of the following is a type of motion where the velocity of an object remains constant?
(A) Accelerated motion (B) Simple harmonic motion
(C) Projectile motion (D) Uniform motion
13. Which of the following is a type of electromagnetic radiation with the shortest wavelength?
(A) Ultraviolet radiation (B) X-rays
(C) Gamma rays (D) Radio wave
14. Which of the following is a phenomenon where the wavelength of light increases or decreases due to the relative motion of the source and the observer?
(A) Interference (B) Doppler effect (C) Diffraction (D) Polarization
15. Which of the following is the site of protein synthesis in a cell?
(A) Mitochondria (B) Nucleus
(C) Ribosomes (D) Endoplasmic reticulum
16. Which of the following is the energy required to remove an electron from an atom or a molecule?
(A) Ionization energy (B) Bond energy
(C) Activation energy (D) Kinetic energy
17. Which of the following is NOT a vector quantity?
(A) Velocity (B) Force (C) Distance (D) Acceleration
18. Which of the following is an example of a Lewis acid?
(A) HCl (B) AlF_3 (C) H_2O (D) NaOH
19. Which of the following is Not a characteristic of prokaryotic cells?
(A) Presence of membrane-bound organelles

- (B) Lack of a true nucleus
(C) Smaller size compared to eukaryotic cells
(D) Presence of a cell wall
20. Which of the following is the genetic material of a virus?
(A) DNA (B) RNA
(C) Both DNA and RNA (D) Neither DNA nor RNA
21. Which of the following is not a type of chemical bond?
(A) Ionic bond (B) Covalent bond (C) Hydrogen bond (D) Magnetic bond
22. Which of the following is a process of soil formation where the parent material is broken down by physical and chemical weathering and mixed with organic matter?
(A) Pedogenesis (B) Laterization (C) Podzolization (D) Soil Profile
23. Which of the following is the highest mountain peak in India?
(A) Kanchenjunga (B) Everest (C) Annapurna (D) Dhaulagiri
24. Which of the following is a type of immunity that is acquired through exposure to a pathogen or through vaccination?
(A) Innate immunity (B) Passive immunity (C) Active immunity (D) Herd immunity
25. Which of the following is the process by which DNA is replicated prior to cell division?
(A) Transcription (B) Translation (C) Replication (D) Mutagenesis
26. Which of the following is a coastal city located in the western part of India?
(A) Kolkata (B) Chennai (C) Kochi (D) Guwahati
27. Which of the following is NOT a type of plate boundary?
(A) Convergent boundary (B) Divergent boundary
(C) Transform boundary (D) Parallel boundary
28. Which of the following is the hardest mineral known?
(A) Talc (B) Quartz (C) Diamond (D) Feldspar
29. Which of the following is the sum of the first 10 natural numbers?
(A) 45 (B) 50 (C) 55 (D) 60
30. Which of the following is NOT a type of volcano?
(A) Shield volcano (B) Composite volcano
(C) Caldera (D) Horst and graben
31. Which of the following is the process by which plants convert light energy into chemical energy in the form of glucose?
(A) Photosynthesis (B) Cellular respiration
(C) Fermentation (D) Glycolysis

32. What international convention seeks to ensure the conservation and sustainable use of the world's biodiversity?
- (A) The United Nations Framework Convention on Climate Change
(B) The Convention on Biological Diversity
(C) The Convention on the International Trade in Endangered Species of Wild Fauna and Flora
(D) The Convention on Wetlands of International Importance
33. Which of the following is not a type of rainfall in India?
- (A) Orographic rainfall (B) Convectional rainfall
(C) Cyclonic rainfall (D) Compositional rainfall
34. Which of the following is a type of metamorphism that occurs due to the high pressure and temperature associated with mountain-building processes?
- (A) Regional metamorphism (B) Contact metamorphism
(C) Hydrothermal metamorphism (D) Generation of magma
35. Which of the following is a landlocked state in India?
- (A) West Bengal (B) Nagaland (C) Kerala (D) Andhra Pradesh
36. Which of the following is NOT a renewable energy source?
- (A) Wind (B) Solar (C) Tidal (D) Natural gas
37. Which of the following is an example of a biotic factor in an ecosystem?
- (A) Temperature (B) Water availability (C) Soil type (D) Predation
38. Which of the following is a characteristic of an oligotrophic water body?
- (A) High nutrient levels (B) High productivity
(C) Low oxygen levels (D) Clear water
39. Which of the following is a primary pollutant?
- (A) Sulfur dioxide (B) Ozone (C) Nitrogen oxides (D) Particulate matter
40. What day is celebrated on March 22nd to focus attention on the importance of freshwater and to advocate for the sustainable management of freshwater resources?
- (A) World Wetland (B) World Water Day
(C) World River Day (D) World Rainfall day
41. What is the value of $\log_2 8$?
- (A) 2 (B) 3 (C) 4 (D) 8
42. Which of the following is NOT a plant hormone?
- (A) Auxin (B) Gibberellin (C) Melatonin (D) Absciscic acid
43. Which of the following is the process by which cells engulf and break down external substances?

- (A) Endocytosis (B) Exocytosis (C) Osmosis (D) Active transport
44. Which of the following particles has the smallest mass?
 (A) Electron (B) Proton (C) Neutron (D) Alpha particle
45. Which of the following is NOT a measure of dispersion?
 (A) Standard deviation (B) Variance
 (C) Range (D) Mean
46. What is the probability of rolling a 5 or a 6 on a standard six-sided dice?
 (A) $1/3$ (B) $1/2$ (C) $1/6$ (D) $2/3$
47. Which national park in India is located in the state of Jammu and Kashmir and is known for its population of the endangered snow leopard?
 (A) Dachigam National Park (B) Bandipur National Park
 (C) Nagarhole National Park (D) Jim Corbett National Park
48. Which of the following is the correct definition of the Pythagorean Theorem for a triangle with base= a, perpendicular= b and hypotenuse=c?
 (A) $a^2 + c^2 = b$ (B) $b^2 + c^2 = a$ (C) $a + b = c^2$ (D) $a^2 + b^2 = c^2$
49. What day is celebrated on June 5th to promote environmental awareness and action?
 (A) World Water day (B) World Earth day
 (C) World Environment day (D) World Food day
50. What is a mangrove forest?
 (A) A type of wetland found in saltwater environment
 (B) A type of wetland found in freshwater environment
 (C) A type of wetland found in temperate environment
 (D) A type of wetland found in tropical environment
51. Which statistical test is used to compare the means of two independent groups?
 (A) ANOVA (B) t-test (C) Chi-square test (D) Regression analysis
52. Which type of correlation coefficient indicates a strong relationship between two variables?
 (A) 0.1 (B) 0.5 (C) -0.2 (D) -0.9
53. What is the process of soil degradation caused by wind and water, leading to the loss of top soil?
 (A) Erosion (B) Eutrophication (C) Salinization (D) Leaching
54. Which of the following statements is TRUE about a normal distribution?
 (A) It is a positively skewed distribution (B) It has Mean=Mode=Median
 (C) It has a bimodal distribution (D) It is a discrete distribution

55. What international convention is designed to prevent the spread of persistent organic pollutants (POPs)?
- (A) The Rotterdam Convention (B) The Basel Convention
(C) The Minamata Convention (D) The Stockholm Convention
56. Which protocol is aimed at reducing emissions of pollutants from ships by setting limits on sulfur oxide and nitrogen oxide emissions and requiring the use of fuels with lower sulfur content?
- (A) The Kyoto Protocol (B) The Paris Agreement
(C) The MARPOL Protocol (D) The Rotterdam Convention
57. Which of the following cities in the Indian state of West Bengal is known as the "land of the thunderbolt"?
- (A) Kolkatta (B) Kalimpong (C) Kurseong (D) Darjeeling
58. Ramsar Convention is
- (A) An international treaty for the conservation and sustainable use of wetlands
(B) A national park in India known for its high altitude wildlife
(C) A UNESCO World Heritage Site in India
(D) A famous wetland in South America
59. Which of the following is an example of provisioning ecosystem services?
- (A) Water purification and carbon sequestration
(B) Timber production and fishing
(C) Soil formation and nutrient cycling
(D) Climate regulation and pollination
60. Which of the following is not a programming language?
- (A) Python (B) Java (C) Cobra (D) Fortran
61. The acid present in gastric juice is
- (A) Sulphuric acid (B) Hydrochloric acid (C) Nitric acid (D) Acetic acid
62. Who was the first woman President of India?
- (A) Droupadi Murmu (B) Pratibha Patil (C) Sarojini Naidu (D) Indira Gandhi
63. The range of a dataset is
- (A) The average of all values in the dataset
(B) The value that occurs most frequently
(C) The middle value in the dataset
(D) The difference between the highest and lowest values
64. Which measure of central tendency is NOT affected by extreme values?

- (A) Median (B) Mode (C) Mean (D) Range
65. What is the median of the following dataset: 5, 7, 8, 9, 11, 12, 15?
 (A) 7 (B) 8 (C) 9 (D) 11
66. Which of the following concepts refer to the system of ranking individuals and groups within societies?
 (A) Socialization (B) Stratification (C) Globalization (D) Discrimination
67. Under Atal Bhujal Yojana, priority areas for implementation are selected based on
 (A) Groundwater used for domestic purposes
 (B) Groundwater used for industrial development
 (C) Level of groundwater depletion
 (D) Groundwater used for agricultural productivity
68. Which of the following components is NOT a part of Swachh Bharat Abhiyan?
 (A) Solid waste management (B) Promotion of renewable energy
 (C) Open Defecation Free India (D) Cleanliness drives and awareness campaigns
69. The Environmental Impact Assessment (EIA) process in India is governed by which regulatory body?
 (A) Ministry of Environment, Forest and Climate Change
 (B) Central Pollution Control Board
 (C) National Green Tribunal
 (D) NITI Aayog
70. Which of the following principles of environmental ethics is promoted by the principle of "Ahimsa" (non-violence) in Indian philosophy?
 (A) Preservation of biodiversity (B) Resource reuse
 (C) Non-exploitation of nature (D) Conservation of natural resources
71. According to Indian environmental ethics, what is the concept of "Vasudhaiva Kutumbakam"?
 (A) Respect for all living beings (B) Harmony between humans and nature
 (C) Conservation of biodiversity (D) The world is one family
72. Which of the following acts does not fall under the purview of National Green Tribunal (NGT)?
 (A) Wildlife Protection Act, 1972 (B) Environmental Protection Act, 1986
 (C) Public Liability Insurance Act, 1991 (D) Biological Diversity Act, 2002
73. Which of the following is commonly used in the manufacturing of cement?

(A) Limestone (B) Feldspar (C) Hornblende (D) Magnetite

74. Which among the following is the southernmost Biospheres Reserve in India?

(A) Simlipal Biosphere Reserve (B) Agasthyamalai Biosphere Reserve
(C) Niligiri Biosphere Reserve (D) Gulf of Mannar Biosphere Reserve

75. Which of the following statement is correct as per the India State of Forest Report (ISFR) 2021?

(A) The area under Very Dense Forest (VDF) type has decreased more than 2% in the country
(B) The area under Moderately Dense Forest (MDF) has increased more than 2%
(C) Maharashtra has the maximum area under Trees Outside Forest (TOF) category
(D) Total Forest Cover in the country is less than 20% of total geographical area of the country

x-x-x

MSc(2Yr)(Human Genomics)

1. The reason why individual organisms of the same species are different from each other is
 - (A) transmission of similar variations from one generation to another
 - (B) transmission of genetic material and genetic variations from generation to generation
 - (C) conservative DNA replication
 - (D) transmission of genotypic and phenotypic variation from generation to generation
2. The main difference between deoxyribose and ribose sugar is the presence of
 - (A) OH group at 3' carbon
 - (B) OH group at 5' carbon
 - (C) H group at 3' carbon
 - (D) OH group at 2' carbon
3. Which combination represents purines
 - I. Adenine
 - II. Thymine
 - III. Guanine
 - IV. Cytosine
 - (A) I & II
 - (B) II & III
 - (C) III & I
 - (D) IV & II
4. Genome is the collective term to represent
 - (A) all the different DNA molecules within a cell
 - (B) the total number of chromosomes within a cell
 - (C) all the chromatin within a cell
 - (D) single copy of DNA molecule within a cell
5. Which of the statement about RNA synthesis is incorrect
 - (A) Synthesis of RNA occurs in 5' to 3'
 - (B) Nucleotide sequence of primary RNA transcript is complementary to that of template strand
 - (C) Nucleotide sequence of RNA transcript is complementary to that of sense strand
 - (D) Transcription is the process of RNA synthesis
6. Chromatin is composed of
 - (A) total DNA content of cell
 - (B) DNA and protein
 - (C) RNA and protein
 - (D) DNA and RNA
7. In vertebrates, the DNA of telomeres consists of
 - (A) Multiple tandem copies of sequence TTAGGG
 - (B) Fixed number (n=100) of tandem copies of sequence TTAGGG
 - (C) Multiple tandem copies of sequence TATAGG
 - (D) Fixed number (n=100) of tandem copies of sequence TATAGG
8. If the DNA content of a single chromosome set is represented as C, then human erythrocytes can be represented by
 - (A) 2C
 - (B) 1C
 - (C) 0C
 - (D) 3C

9. All diploid cells contain two copies of each nuclear DNA molecule but the copy of mitochondrial DNA present in such cells is
 (A) two copies (B) variable as per type of cell
 (C) single copy (D) fixed number of copies
10. Each round of cell cycle involves a phase which includes nuclear division and cell division, it is referred to as
 (A) S phase (B) M phase (C) G1 phase (D) G2 phase
11. Which of the following does not contribute to genetic diversity is
 (A) recombination (B) mutation
 (C) consanguineous marriages (D) cross breeding
12. Certain sequences are important in signalling the splice sites that define exon-intron boundaries. Almost all introns start and stop with
 (A) GT and AT respectively (B) AT and GU respectively
 (C) GT and CA respectively (D) GT and AG respectively
13. Which of the following statement about untranslated region is incorrect
 (A) Untranslated region carry regulatory sequences
 (B) Mostly 5' Untranslated region is smaller than 3' untranslated region
 (C) mRNA stability is regulated by untranslated region
 (D) untranslated region contain amino acid encoding triplet codons
14. Methylation, Acetylation, N-lipidation and N-glycosylation represents
 (A) common types of chemical modification of proteins
 (B) common types of chemical modification of DNA
 (C) common types of chemical modification of RNA
 (D) common types of chemical modification of nucleic acids
15. Quaternary structure of protein is the
 (A) overall three-dimensional structure of a polypeptide
 (B) aggregate of linear sequence and three-dimensional structure
 (C) aggregate structure of multimeric protein
 (D) primary structure of four different polypeptide
16. Short cis-acting sequence element that enhances transcriptional activity of a specific eukaryotic gene and are located at variable location is termed as
 (A) Promoter (B) Enhancer
 (C) Silencer (D) Basal transcriptional factor
17. Which of the statement about human genome is false
 (A) The genetic code of Nuclear DNA and mitochondrial DNA is different
 (B) UGA encodes tryptophan instead of STOP codon in mitochondrial genetic code
 (C) Amount of mitochondrial DNA in a cell is more than nuclear DNA due to multiple copies of mitochondria
 (D) Number of mitochondria in a cell depends on the type of cell
18. If an affected father transmits the disease to all his daughters but not to his son then disease shows
 (A) Autosomal dominant inheritance (B) Autosomal recessive inheritance

- (C) Sex-linked dominant inheritance (D) Sex-linked recessive inheritance
19. Prader-Willi syndrome and Angelman syndrome are the best examples of
 (A) Genomic imprinting (B) Pseudodominance
 (C) Mendelian inheritance (D) Cytoplasmic inheritance
20. Which of the following is an incorrect statement
 (A) The gap phase between S phase and M phase represents the longest phase
 (B) The gap phase between M phase and S phase represents the longest phase
 (C) Cells will enter S phase only when they are committed to mitosis
 (D) G0 phase can be considered as modified G1 phase
21. DNA is separated in a native PAGE on the basis of
 (A) Negatively charged side chain (B) Charge to mass ratio
 (C) Positively charged side chains (D) Molecular weight
22. Proteins in SDS-PAGE are visualized by
 (A) SYBR green stain (B) Coomassie blue
 (C) Ethidium bromide (D) Bromophenol blue
23. When two genes on a chromosome do not assort independently, it represents
 I. hot spot recombination region
 II. recombination desert region
 III. linked region
 IV. higher genetic map distance
 (A) I & IV (B) II & III (C) II & IV (D) III & IV
24. Prostaglandins play key role in the generation of
 (A) Allergic reaction (B) Inflammatory response
 (C) Antibodies (D) Hypersensitivity
25. The consequence of a sense mutation in a protein coding gene is
 (A) Shortening of gene product (B) Expansion of repetitive DNA
 (C) Elongation of gene product (D) Substitution of residues in the gene product
26. Which among the following is not a characteristic of replicon
 (A) is self-replicating (B) requires integration in host genome
 (C) their DNA can be isolated in intact form (D) also known as vectors
27. Which gel electrophoresis would be best for separation of DNA fragments ranging from 10kb to 20kb
 (A) Agarose 0.8% (B) Agarose 2%
 (C) Polyacrylamide 12% (D) Polyacrylamide 5%
28. A simple technique in which cells if subjected to electric shock, take up exogenous DNA directly from suspending solution is referred to as
 (A) Transformation (B) Vacuum transfer
 (C) Electroporation (D) Plasmapheresis

29. To increase the transformation efficiency of *E. coli*, which one of the following is of no use
- Usage of frozen competent cells
 - Packaging recombinant DNA into virus particle
 - Electroporation
 - Usage of large molecular weight DNA fragments
30. What causes fire in dumping ground?
- Decomposition of non-biodegradable waste
 - Alcohol & aerobic decomposition
 - Hospital waste
 - Methane & Heat
31. In agarose gel electrophoresis, DNA can be easily visualised because
- DNA and bromophenol blue have same molecular weight
 - Appropriate intercalating stain is present in the gel
 - Loading buffer interacts with DNA and it becomes visible
 - DNA is negatively charged
32. Which of the following do not represents an autoimmune disorder
- Tay-Sachs Disease
 - Graves' Disease
 - Encephalitis
 - Leucoderma
33. Which of the following is incorrect with respect to the purpose of gel loading buffer in DNA gel electrophoresis
- helps track how far DNA has migrated
 - Increases the volume of DNA sample
 - Increases the density of DNA sample
 - Acts as intercalating dye
- I & IV
 - II & III
 - I & III
 - II & IV
34. Which of the following combination do not indicate protein quantification method?
- TCA precipitation method
 - BCA method
 - Edman degradation
 - Kjeldahl method*
- I & II
 - II & III
 - I & III
 - II & IV
35. Maternal effect & maternal inheritance can best explain
- Complex communicable diseases
 - Extra chromosomal inheritance
 - Nuclear inheritance
 - Late onset diseases
36. Which of the following combination commonly represents metabolic diseases
- Parkinson's disease
 - Liver cirrhosis
 - Diabetes
 - Huntington's disease

- (A) I & II (B) II & III (C) I & III (D) I & IV

- 37.** Genome editing technologies provide scientists the
 (A) Ability to completely replace the mutant genome with healthy genome
 (B) Power to become the creator of human biology
 (C) Ability to rectify all kinds of genetic mutations
 (D) Ability to add, remove or alter genetic material at particular location in genome
- 38.** Antibodies that target foreign antigens are important component of defence in
 (A) Auto immune diseases (B) Infectious diseases
 (C) Immunodeficiencies (D) Genetic diseases
- 39.** Hoescht, SYBR Green, Ethidium bromide represents
 (A) Stains with same functional group
 (B) Fluorescent stains used for visualising proteins
 (C) Stains which differentiate dead cells from viable cells
 (D) Nucleic acid stains
- 40.** Which of the following combination represents phenomena which limit genetic diversity
 I. Founder effect
 II. Population bottleneck
 III. Genetic drift
 IV. Genomic imprinting
 (A) I, II, III (B) II, III, IV (C) III, IV, I (D) I, II, IV
- 41.** Autocrine signalling means
 (A) Production and secretion of an extracellular mediator by neighbouring cell
 (B) Production and secretion of an extracellular mediator by cell to signal itself
 (C) Production and secretion lipid soluble mediator by neighbouring cell
 (D) Production and secretion of an extracellular mediator by endocrine system
- 42.** Which among the following is the main constituent of biogas
 (A) Ethane (B) Methane (C) Butane (D) Propane
- 43.** Which of the following combinations represents unicellular organism with increasing genome size
 (A) *E. coli* < *S. cerevisiae* < *Amoeba dubia*
 (B) *C. elegans* < *Amoeba dubia* < *Allium cepa*
 (C) *S. cerevisiae* < *E. coli* < *Allium cepa*
 (D) *S. cerevisiae* < *C. elegans* < *D. melanogaster*
- 44.** The replication of chromosomes in the absence of cell or nuclear division leads to formation of
 (A) Carcinoma (B) Polyploidy (C) Euploidy (D) Endometrosis
- 45.** Which among the following element is an essential constituent of acids

- (A) Nitrogen (B) Oxygen (C) Helium (D) Hydrogen
46. Which of the following is the most abundant organic compound in nature
(A) Sucrose (B) Fructose (C) Glucose (D) Cellulose
47. Bhopal gas tragedy 1984 was caused due to leakage of
(A) Methyl isochloride (B) Methyl isoclorate
(C) Methyl isocyanate (D) Methyl isocyanide
48. The chemical name of laughing gas is
(A) Nitrous oxide (B) Nitric oxide
(C) Nitrogen penta oxide (D) Nitrogen
49. What happens in an oxidation reaction
(A) Gain of electrons (B) Loss of electrons
(C) Gain of protons (D) Loss of protons
50. Vinegar, a common component of most of the kitchens is also known as
(A) Citric acid (B) Oxalic acid (C) Acetic acid (D) Nitric acid
51. Mostly school bells are made of metals because metal is
(A) Ductile (B) Malleable (C) Sonorous (D) Lustrous
52. Which of the following is not an epigenetic mechanism:
(A) Methylation (B) Transition (C) Acetylation (D) RNA interference
53. Erythroblastosis foetalis occurs when:
(A) Husband is Rh⁻ and wife Rh⁻ (B) Wife is Rh⁺ and husband Rh⁻
(C) Wife is Rh⁺ and husband Rh⁺ (D) Wife is Rh⁻ and husband Rh⁺
54. If there were 5 nucleotides instead of 4 and codon was still formed by a triplet codon then how many possible codons would have been generated?
(A) 243 (B) 125 (C) 122 (D) 240
55. What all is included in plagiarism
I. Secretly copying someone else's research material and producing as your own
II. Reproducing someone else's research material with little modification
III. Act of copying another person's ideas
IV. Re-mixing or altering copyrighted images, video or audio even if done in original way
(A) I, III, IV (B) I, II, III (C) I, II, III, IV (D) I, III
56. Which of the strategies can prevent the transmission of mitochondrial DNA disease
(A) RNAi
(B) Nuclear transfer technique
(C) Irradiation of affected mitochondrial DNA
(D) Embryonic stem cell therapy
57. Which of the following technology can easily assay oligonucleotide repeat expansion

- (A) MLPA
- (B) GWAS
- (C) CGA
- (D) Target sequence enrichment

58. Hardy Weinberg law relates

- (A) genotypic frequencies to allelic frequency in a selected mating population
- (B) genotypic frequencies to phenotypic frequency in a random mating population
- (C) allelic frequency to phenotypic frequency in a random mating population
- (D) genotypic frequencies to allelic frequency in a random mating population

59. Irregular sex chromosome constitutions are fairly common in humans, which composition will lead to female phenotype

- (A) XXYY
- (B) XXXX
- (C) XXY
- (D) YO

60. Why are monozygotic twins genetically identical, whereas dizygotic twins have only $\frac{1}{2}$ of their genes in common on average?

- (A) Monozygotic twins tend to look more similar
- (B) Monozygotic twins are always the same sex
- (C) Dizygotic twins occur more frequently with older mothers
- (D) Monozygotic twins develop from a single embryo, whereas dizygotics develop from two embryos

61. Doxorubicin is used as anticancer drug because

- (A) it inhibits DNA gyrase
- (B) it inhibits DNA ligase
- (C) it inhibits eukaryotic type II topoisomerase
- (D) it inhibits eukaryotic polymerase

62. Quorum sensing is helpful in

- (A) Energy calculation
- (B) Correlation of population (microbial) density
- (C) Measuring radiations
- (D) Identification of isotopes

63. In statistics, the multiplication rule states

- (A) the probability of any one of two or more mutually exclusive events
- (B) the probability of two or more independent events occurring together
- (C) the probability of any one of two events
- (D) the probability of two events occurring independently

64. A person is wearing spectacles with concave lenses for correcting vision. While not using the glasses, the image of a distant object in his case will be formed

- (A) On the blind spot
- (B) Behind the retina
- (C) In front of retina
- (D) On yellow spot

65. A man produces following kinds of sperm in equal proportions: AB, Ab, aB & ab. What is his genotype with reference to the genes specified?

- (A) AAbb
- (B) aaBB
- (C) AaBb
- (D) Aabb

66. The chemical which is typically released by the body in an allergic response is

- (A) Histamines
- (B) Antihistamines
- (C) Perforins
- (D) Allergens

67. Amplification refractory mutation system utilizes
- (A) the mismatch at 3' end of PCR primer using taq I polymerase that lacks proofreading activity
 - (B) the mismatch at 5' end of PCR primer using any standard taq I polymerase
 - (C) fluorescently labelled probe to detect mutation
 - (D) methylation of cytosine to detect mutation
68. Cellular disease model are helpful in understanding the molecular basis of disease and they are also useful in
- (A) preclinical toxicity tests
 - (B) post clinical toxicity tests
 - (C) exhibiting same symptoms as in humans
 - (D) preimplantation genetic diagnosis
69. The non-viral transfer of DNA, RNA or oligonucleotides into human or other animal cells is less efficient and is termed as
- (A) Transduction
 - (B) Transfection
 - (C) Ex vivo gene therapy
 - (D) Infection
70. Insulin, blood clotting factor IX, Interferon alpha and leptin are the examples of
- (A) Genetically engineered therapeutic antibodies
 - (B) CRISPR CAS gene editing technology
 - (C) Therapeutic recombinant proteins
 - (D) Single chain variable fragment (scFv) antibodies
71. Which of the statement is false about individuals who are slow metabolizers
- (A) They have stronger response to a given concentration of drug
 - (B) They can be at risk of overdose
 - (C) They gain little therapeutic benefit from the drug
 - (D) They eliminate or inactivate drugs comparatively slowly
72. Augmentation therapy is best suited for
- (A) Loss of function genetic diseases
 - (B) Gain of function genetic diseases
 - (C) Altering the disease susceptibility alleles
 - (D) Haploinsufficiency
73. Protein misfolding is a common cause of disease in many genetic diseases like
- (A) Angelman syndrome and Prader-Willi syndrome
 - (B) Cystic fibrosis and phenylketonuria
 - (C) Diabetes and Obesity
 - (D) Turner syndrome and Klinefelter syndrome
74. Full form of NCBI that advances science and health by providing access to biomedical and genomic information is
- (A) National centre for biotechnology information
 - (B) Nuclear council for biotechnology interactions
 - (C) Nuclear centre for biomedical information

(D) National council for biomedical information

75. The smallest unit of information, a computer can understand and process is termed as a
(A) Crumb (B) Bit (C) Byte (D) Nibble

x-x-x

MSc(2Yr)(Nuclear Medicine)

1. When two atomic nuclei combine it is called as
(A) Chain reaction (B) Nuclear fusion (C) Nuclear decay (D) Nuclear fission
2. The modern atomic mass scale is based on
(A) $^1\text{H}_1$ (B) $^1\text{H}_2$ (C) $^{12}\text{C}_{12}$ (D) $^{16}\text{O}_{16}$
3. Helium nuclei particles are called
(A) Gamma particles (B) Beta particles (C) Alpha particles (D) Delta particles
4. *Nuclear medicine* is a medical specialty that *makes use of* _____ to assess bodily functions and to diagnose and treat disease
(A) Radio waves (B) Radiopharmaceuticals
(C) Nanoparticles (D) UV rays
5. Which of the following has the greatest ionization power?
(A) beta particles (B) gamma particles
(C) neutrons (D) alpha particles
6. What does metastable means?
(A) When an isomeric state is longer than 10^5 seconds
(B) When an isomeric state is longer than 10^7 seconds
(C) When an isomeric state is longer than 10^9 seconds
(D) When an isomeric state is longer than 10^{12} seconds
7. Radiation weighting factor (w_R) for Gamma-ray is:
(A) 10 (B) 20 (C) 2 (D) 1
8. ^{15}O , ^{16}O and ^{18}O are an example of
(A) Isotopes (B) Isotones (C) Isobars (D) Isomers
9. A nucleus will undergo gamma decay when
(A) It has excess of neutrons (B) It has excess of protons
(C) It's in excited state (D) It has large mass
10. The atomic number is not changed by which type of radioactive decay?
(A) Alpha
(B) β^+ decay
(C) Gamma
(D) β^- decay
11. Roentgen is a measure of
(A) Radiation exposure (B) Absorbed dose (C) Radioactivity (D) Effective dose
12. When the daughter radionuclide has a half life longer than that of the parent, there is a _____ equilibrium
(A) Transient (B) Secular
(C) Both transient and secular (D) No equilibrium
13. The term used to refer something performed on computers or computer simulation models
(A) *In vitro* (B) *In vivo* (C) *In silico* (D) *Ex-vivo*
14. The volume of air breathed in and out during normal breathing is called
(A) Vital capacity (B) Tidal volume
(C) Inspiratory reserve volume (D) Residual volume
15. Photoelectric effect was discovered by

- (A) Hertz (B) Einstein (C) Faraday (D) Plank

16. Cardiac output is
 (A) Equal to Stroke Volume (B) Equal to end diastolic volume
 (C) Stroke volume X End systolic volume (D) Stroke volume X Heart rate
17. The exchange of oxygen and carbon dioxide between alveolar air and pulmonary blood (external respiration) is governed by
 (A) Boyle's law only (B) Boyle's law and Henry's law
 (C) Dalton's law and Boyle's Law (D) Dalton's law and Henry's law
18. Scintillation detectors convert
 (A) Gamma ray energy into a current (B) Visible light into ultraviolet light
 (C) Gamma ray energy into visible light (D) Electron energy into potential energy
19. What happens to the resistance of a pure semiconductor when heated?
 (A) The resistance increases
 (B) The resistance decreases
 (C) The resistance remains same
 (D) The resistance will first increases and then decrease
20. Which of the following does a hole in the semiconductor define?
 (A) A free proton
 (B) A free neutron
 (C) A free-electron
 (D) An incomplete part of an electron pair bond
21. Which of the following statements is true about extrinsic semiconductors?
 (A) The gap between the conduction band and the valence band is more than 16 eV
 (B) The gap between the conduction band and the valence band is about 1 eV
 (C) The gap between the conduction band and valence band is 100 eV and more
 (D) The conduction band and the valence band overlap
22. Which interaction may play a role in the formation of quaternary structure by covalently linking different polypeptide chains?
 (A) Hydrogen bonds (B) Hydrophobic interactions
 (C) Disulphide bridges (D) Electrostatic interactions
23. Medullary haematopoiesis occurs in
 (A) Liver (B) Spleen (C) Kidney (D) Bone marrow
24. The main interaction processes of neutrons in biological matter are:
 (A) Magnetic scattering (B) Coulomb scattering by orbital electrons
 (C) Fission (D) Elastic and inelastic scattering by nuclei
25. The half life of ^{99m}Tc is
 (A) 3 hours (B) 5 hours (C) 6 hours (D) 64 hours
26. ^{32}P emits
 (A) Alpha rays (B) Beta rays
 (C) Gamma rays (D) Both alpha and beta rays
27. Which amongst the following is the most radiosensitive cell?
 (A) Lymphocyte (B) Neuron (C) Hepatocyte (D) Muscle cell

28. Half life of radioiodine-131 is
 (A) 8 hours (B) 18 hours (C) 8 days (D) 18 days
29. ^{131}I is used for the treatment of
 (A) Heart diseases (B) Hyperthyroidism (C) Hypothyroidism (D) Gliomas
30. X-rays were invented by
 (A) Henri Becquerel (B) Roentgen (C) Marie Curie (D) Pierre Curie
31. The first radioactive element discovered was
 (A) Uranium (B) Polonium (C) Radium (D) Thorium
32. Nuclear Medicine makes use of which type of radioisotopes for imaging purposes?
 (A) Alpha emitting radioisotopes
 (B) Beta emitting radioisotopes
 (C) Gamma emitting radioisotopes
 (D) Both Alpha and Beta emitting radioisotopes
33. Which of the following should be considered the main source of background radiations?
 (A) Electrons (B) Neutrons (C) X-rays (D) Alpha Particles
34. Which of the following statements is not correct for $^{99\text{m}}\text{Tc}$
 (A) Is a metastable nuclear isomer of ^{99}Tc
 (B) Involved in isomeric transition
 (C) After emission, the ground state ^{99}Tc decays to stable rehenium
 (D) Has a short physical half life of 6 hrs
35. Cobalt-60 emits
 (A) Alpha rays (B) Beta rays (C) Gamma rays (D) Neutrons
36. Which of the following radionuclides can be used for Positron emission tomography
 (A) $^{99\text{m}}\text{Tc}$ (B) ^{131}I (C) ^{51}Cr (D) ^{18}F
37. Gamma rays can be most effectively stopped by
 (A) Air (B) A piece of wood
 (C) A thin sheet of aluminium (D) A thick piece of lead
38. A vertical line which divides the body into a front (anterior) section and back (posterior) section is called
 (A) Sagittal plane (B) Lateral plane (C) Transverse plane (D) Coronal plane
39. Which of the following isotope is not a radioisotope
 (A) ^{13}C (B) ^{14}C (C) ^{35}S (D) ^3H
40. In a radionuclide generator, the short-lived $^{99\text{m}}\text{Tc}$ is continually produced by decay of which parent radionuclide?
 (A) ^{235}U (B) ^{236}U (C) ^{98}Mo (D) ^{99}Mo
41. Which body regulates nuclear & radiation facilities and activities to ensure that the use of ionizing radiation and nuclear energy in India does not cause undue risk to health and the environment?
 (A) IAEA (B) AERB (C) ICRP (D) FDA
42. Who discovered neutron?
 (A) James Chadwick (B) Rutherford (C) J J Thomson (D) Carl Anderson

43. The resistivity of certain metals or alloys drops to zero when they are cooled below a certain temperature, this phenomenon is known as———.
- (A) Conductivity (B) Partial conductivity
(C) Superconductivity (D) Non-conductivity
44. In an atom, the electrons are held to the nucleus by
- (A) Columb's Force (B) Nuclear Force
(C) Gravitational Force (D) Van Der Waal's Force
45. In a nuclear reaction, which of the following quantity/quantities is not conserved?
- (A) Mass (B) Charge (C) Mass and charge (D) Mass and Momentum
46. Which spectroscopic technique detects -SH group and disulphide linkages in proteins
- (A) CD spectroscopy (B) Fluorescence spectroscopy
(C) NMR spectroscopy (D) FTIR spectroscopy
47. The resting membrane potential of a neuron is
- (A) -65mV (B) -80 mV (C) -70 mV (D) -90mV
48. *A deterministic effect:*
- (A) has a threshold in dose but the severity of the effect is otherwise dose-independent.
(B) has no threshold in dose and the severity of the effect is a constant function of dose.
(C) has a threshold in dose and the severity of the effect increases with dose.
(D) has no threshold in dose and the severity of the effect increases with dose.
49. 4 Roentgen is equal to
- (A) 8×10^{12} ionisations/gm of tissue (B) 8×10^{11} ionisations/gm of tissue
(C) 8×10^{10} ionisations/gm of tissue (D) 8×10^8 ionisations/gm of tissue
50. The excess neutrons in a nuclear reactor is absorbed by
- (A) Neodymium (B) Vanadium (C) Cadmium (D) Indium
51. A molecule that adds hydrogen ions to a solution is known as
- (A) A buffer (B) A base
(C) An acid (D) A hydrophobic substance
52. Which of the following waves have a maximum frequency?
- (A) infrared waves (B) gamma rays (C) microwaves (D) radio waves
53. Which of the following proves that electromagnetic waves are transverse?
- (A) Reflection (B) Diffraction (C) Interference (D) Polarisation
54. In a semiconductor, what is responsible for conduction?
- (A) Electrons only (B) Holes only
(C) Both electrons and holes (D) Neither electrons nor holes
55. Which of the following is both an endocrine and exocrine gland?
- (A) Pituitary (B) Ovary (C) Thyroid (D) Pancreas
56. Intercostal muscles are attached with
- (A) Diaphragm (B) Thigh (C) Abdomen (D) Ribs
57. Which of the following parts of the brain controls body temperature and hunger?
- (A) Thalamus (B) Hypothalamus (C) Pons (D) Cerebellum

58. When placed in a magnetic field, all the random spins of the nuclei
 (A) Stop (B) Reverse direction
 (C) Align with the magnetic field (D) Rotate to 90° away from the induced field
59. In an action potential, depolarization is due to
 (A) K^+ efflux (B) Na^+ efflux (C) Na^+ influx (D) K^+ influx
60. The antibody which can cross placental barrier is.
 (A) IgA (B) IgE (C) IgM (D) IgG
61. The ideal gamma ray energy for nuclear medicine imaging is between
 (A) 100-300 Mev (B) 300-500Kev (C) 300-500Mev (D) 100-300 Kev
62. Which of the following cells actively participate during allergy?
 (A) B-lymphocytes (B) Liver cells (C) Mast cells (D) Red blood cells
63. Carcinoma arises from the _____.
 (A) Epithelial cells (B) Bone Marrow
 (C) Pigment containing Cells (D) Lymphoid tissue
64. A kind of an injury or damage, which results in the premature death of all the nearby cells in a tissue or an organ through autolysis is called _____.
 (A) Neurosis (B) Necrosis (C) Apoptosis (D) Cellular senescence
65. Antigen-binding site in an antibody, is found between:
 (A) One heavy and one light chain only
 (B) Either between two light chains or between one heavy and one light chain
 (C) Two light chains only
 (D) Two heavy chains only
66. A complete cardiac cycle requires
 (A) 0.8 second (B) 0.6 second (C) 0.4 second (D) 1.0 second
67. The chamber of the heart with thickest myocardium is
 (A) Right Ventricle (B) Right Atrium (C) Left Ventricle (D) Left Atrium
68. Which of the following is required for the production of erythrocytes
 (A) Vitamin A (B) Vitamin E (C) Vitamin K (D) Vitamin B12
69. The energy of beta particle for strontium-90 is
 (A) 346.2 Kev (B) 546.2 Kev (C) 746.2 Kev (D) 946 Kev
70. Ga-68 is a
 (A) Beta emitter (B) Gamma emitter (C) Positron emitter (D) Alpha emitter
71. A film badge refers to
 (A) Dosimeter (B) Sonometer (C) Photographic film (D) Identification plate
72. X-rays were discovered in
 (A) 1890 (B) 1895 (C) 1899 (D) 1889
73. Sound waves are an example of
 (A) Transverse wave (B) Longitudinal wave
 (C) Electromagnetic wave (D) Both transverse and longitudinal wave
74. Which amongst the following contributes the most towards radiation exposure to general public
 (A) Naturally occurring radioactive form of potassium (Potassium 40)
 (B) Cosmic radiations
 (C) Radon

(D) Consumer products

75. Which of the following is used for targeted alpha therapy?

(A) Radium-223 (B) Leutitium-177 (C) Gallium-68 (D) Strontium-90

x-x-x

MSc(2Yr)(Microbial Biotechnology)

1. Who is considered the father of modern biotechnology?
(A) Robert Koch (B) Louis Pasteur (C) Paul Berg (D) Herbert Boyer
2. What is the name of microorganisms that are added to food products to improve their nutritional value?
(A) Probiotics (B) Antibiotics (C) Antimicrobials (D) Fermenters
3. Which of the following microscopes is used for observing living cells in culture?
(A) Transmission electron microscope (B) Scanning electron microscope
(C) Phase contrast microscope (D) Fluorescence microscope
4. Which of the following classification systems is based on molecular phylogeny?
(A) Whittaker's five kingdom classification
(B) Carl Woese's three-kingdom classification
(C) Numerical taxonomy
(D) Binomial Nomenclature
5. Which of the following microorganisms is used as a biopesticide?
(A) *Streptomyces* (B) *Rhizobium*
(C) *Bacillus thuringiensis* (D) *Saccharomyces cerevisiae*
6. Which of the following microorganisms is responsible for causing spoilage in canned foods?
(A) *Escherichia coli* (B) *Clostridium botulinum*
(C) *Staphylococcus aureus* (D) *Listeria monocytogenes*
7. What is the semiconservative nature of DNA replication?
(A) Both strands of DNA are newly synthesized
(B) One strand of DNA is newly synthesized, while the other is conserved from the original DNA molecule
(C) Both strands of DNA are conserved from the original DNA molecule
(D) One strand of DNA is conserved from the original DNA molecule, while the other is newly synthesized
8. Which of the following is a mechanism for DNA repair?
(A) Translation synthesis (B) Splicing
(C) Nucleotide excision repair (D) Promoter clearance
9. Which of the following is involved in the initiation of transcription in prokaryotes?
(A) Transcription factors (B) Enhancers
(C) Promoter (D) Sigma factor
10. Which of the following is a post-translational modification of proteins?
(A) Splicing (B) Polyadenylation (C) Phosphorylation (D) Base excision repair

11. What is the difference between inducible and repressible operons?
 - (A) Inducible operons are always turned on, while repressible operons are always turned off
 - (B) Inducible operons are turned on by the presence of a specific molecule, while repressible operons are turned off by the presence of a specific molecule
 - (C) Inducible operons are turned on by a repressor protein, while repressible operons are turned off by an activator protein
 - (D) Inducible operons are involved in the synthesis of essential molecules, while repressible operons are involved in the breakdown of essential molecules
12. What is the purpose of blue-white screening in gene cloning?
 - (A) To identify colonies that contain recombinant DNA
 - (B) To identify colonies that do not contain recombinant DNA
 - (C) To identify colonies that have been transformed
 - (D) To identify colonies that have not been transformed
13. Which of the following is not a technique used for gene cloning?
 - (A) Microinjection
 - (B) Transformation
 - (C) Electroporation
 - (D) ELISA
14. Which of the following is a storage polysaccharide in fungi?
 - (A) Starch
 - (B) Cellulose
 - (C) Chitin
 - (D) Glycogen
15. Which of the following nucleotides is NOT a component of DNA?
 - (A) Adenine
 - (B) Guanine
 - (C) Uracil
 - (D) Cytosine
16. Which of the following is NOT a method for isolation and purification of nucleic acids?
 - (A) Gel electrophoresis
 - (B) Centrifugation
 - (C) Ion exchange chromatography
 - (D) Paper chromatography
17. Which scientist first proposed the germ theory of disease?
 - (A) Louis Pasteur
 - (B) Robert Koch
 - (C) Ignaz Semmelweis
 - (D) Joseph Lister
18. Which scientist is known as the "father of microbiology"?
 - (A) Louis Pasteur
 - (B) Robert Koch
 - (C) Antonie van Leeuwenhoek
 - (D) Edward Jenner
19. Which biotechnology company produced the first genetically engineered insulin for diabetes treatment?
 - (A) Amgen
 - (B) Genentech
 - (C) Eli Lilly
 - (D) Novo Nordisk
20. What is the process of using living organisms to clean up pollution called?
 - (A) Genetic engineering
 - (B) Fermentation
 - (C) Bioremediation
 - (D) Bioprocessing
21. What is the name of the first genetically engineered human insulin?
 - (A) Humulin
 - (B) Lantus
 - (C) Novolog
 - (D) Levemir
22. The BOD (biochemical oxygen demand) of sewage is a measure of:
 - (A) The total amount of oxygen present in the sewage

- (B) The amount of dissolved oxygen required by microorganisms to decompose organic matter in the sewage
- (C) The amount of dissolved oxygen required by fish and other aquatic organisms to survive in the sewage
- (D) The amount of nitrogen present in the sewage
23. Which of the following is NOT an example of a nosocomial infection?
- (A) Surgical site infection (B) Urinary tract infection
- (C) Pneumonia (D) Influenza
24. Which food resource has been genetically modified to contain beta-carotene?
- (A) Wheat (B) Rice (C) Potato (D) Corn
25. Which of the following is not a traditional fermented food?
- (A) Bread (B) Cheese (C) Wine (D) High fructose syrup
26. Which of the following tests is used to determine whether observed data follows a specific distribution?
- (A) F-test (B) Z-test
- (C) T-test (D) Chi-square test for goodness of fit
27. What is the specific activity of an amylase preparation, 0.25 ml of which hydrolyzes 50 μ mol of substrate per minute at 37°C and pH 7.0, when the total protein concentration in the preparation is 2 mg/mL?
- (A) 25 U/mg (B) 50 U/mg (C) 100 U/mg (D) 200 U/mg
28. Which of the following is NOT a measure of central tendency?
- (A) Mean (B) Median (C) Mode (D) Standard deviation
29. Which of the following tests is used to determine if the means of two groups are significantly different?
- (A) ANOVA (B) t-test (C) Chi-square test (D) F-test
30. Which process is responsible for programmed cell death?
- (A) Meiosis (B) Mitosis (C) Apoptosis (D) Necrosis
31. Which technique is used for the preparation of specimens for light and electron microscopy?
- (A) Flow cytometry (B) Shadow casting
- (C) Microtomes and embedding (D) Immunofluorescence
32. What are isoenzymes?
- (A) Enzymes that catalyze the same reaction but have different properties
- (B) Enzymes that catalyze different reactions but have the same properties
- (C) Enzymes that are inactive until they are activated by a protease
- (D) Enzymes that are activated by phosphorylation
33. What is the significance of K_{cat}/K_m in enzyme kinetics?
- (A) It represents the rate constant of the enzyme-substrate complex formation
- (B) It represents the substrate concentration at half-maximal velocity
- (C) It represents the maximum velocity of the reaction
- (D) It represents the catalytic efficiency of the enzyme

34. What is the purpose of the Patent Cooperation Treaty (PCT)?
 (A) To provide a streamlined process for international patent applications
 (B) To regulate the use of intellectual property in research and development
 (C) To provide a platform for patent litigation
 (D) To establish minimum requirements for patentability
35. What is compulsory licensing in the context of patent law?
 (A) The transfer of patent ownership to a third party
 (B) The requirement to disclose the details of a patent
 (C) The government's ability to allow others to use a patented invention without the consent of the patent owner
 (D) The requirement to obtain a license for the use of a patented invention
36. Which of the following is not a requirement for patentability?
 (A) Novelty
 (B) Non-obviousness
 (C) Disclosure requirements
 (D) Public domain
37. Steroid hormones are:
 (A) Water-soluble hormones
 (B) Peptide hormones
 (C) Lipid-soluble hormones
 (D) Amino acid-based hormones
38. Which type of electrophoresis technique is used for separation of large DNA fragments?
 (A) Native-PAGE
 (B) SDS-PAGE
 (C) Pulse field gel electrophoresis
 (D) Isoelectric focusing
39. Which type of spectroscopy is used to study the molecular structure of proteins?
 (A) UV spectroscopy
 (B) Visible spectroscopy
 (C) IR spectroscopy
 (D) NMR spectroscopy
40. Which centrifugation technique is used for the separation of macromolecules and organelles?
 (A) Preparative ultra-centrifugation
 (B) Analytical ultra-centrifugation
 (C) Density gradient centrifugation
 (D) Differential centrifugation
41. Which type of spectroscopy is used to study the crystal structure of materials?
 (A) UV spectroscopy
 (B) Visible spectroscopy
 (C) X-ray diffraction
 (D) NMR spectroscopy
42. What is the theoretical yield of ethanol obtained from 1 kg of corn fructose assuming complete conversion and 100% efficiency?
 (A) 0.51 L
 (B) 0.75 L
 (C) 1.13 L
 (D) 1.92 L
43. A bacterial culture has a generation time of 30 minutes. If the initial cell count was 1×10^6 , how many cells will be present after 2 hours?
 (A) 16×10^6
 (B) 32×10^6
 (C) 64×10^6
 (D) 128×10^6
44. What is $K_L a$ in bioprocessing?
 (A) The rate of reaction in the bioreactor
 (B) The rate of transport of materials in the bioreactor
 (C) The rate of heat transfer in the bioreactor

- (D) The rate of oxygen transfer in the bioreactor
45. Which tool can be used for multiple sequence alignments?
 (A) BLAST (B) FASTA (C) ClustalW (D) SRS
46. Which type of antigen-antibody interaction can be detected using the enzyme-linked immunosorbent assay (ELISA)?
 (A) Passive bacterial agglutination (B) Haemagglutination
 (C) Radioimmunoassay (D) Precipitation reaction
47. Which data-generating technique can be used to identify gene expression levels in a sample?
 (A) PCR (B) Restriction Digestion
 (C) Chromatograms (D) Microarrays
48. What is the purpose of pairwise alignments in sequence analysis?
 (A) To identify open reading frames
 (B) To detect mutations and substitutions
 (C) To identify similar sequences in a database
 (D) To assemble sequences into longer contigs
49. If a 1:10 dilution of a culture was made and 0.1 mL of the diluted culture was spread plated, and 62 colonies were counted, what is the original concentration of cells in the culture?
 (A) 6200 cells/mL (B) 62000 cells/mL
 (C) 620000 cells/mL (D) 6200000 cells/mL
50. Which of the following is a common source of environmental radiation?
 (A) Radon gas (B) Carbon dioxide (C) Methane (D) Oxygen
51. What is the physiological significance of bile pigments?
 (A) Act as an energy source (B) Provide structure to the cell
 (C) Regulate gene expression (D) Aid in digestion and absorption of fats
52. What is the role of tRNA in translation?
 (A) It carries the genetic information from DNA to the ribosome
 (B) It catalyzes the formation of peptide bonds between amino acids
 (C) It provides the energy for translation
 (D) It brings amino acids to the ribosome for incorporation into a growing polypeptide chain
53. Which of the following techniques is used for DNA fingerprinting?
 (A) Southern hybridization (B) Northern hybridization
 (C) RNase protection assay (D) Polymerase chain reaction
54. What is the structure of a peptide bond?
 (A) Rigid and planar (B) Flexible and branched
 (C) Linear and asymmetric (D) Cyclic and stable
55. Which of the following is not a biologically important nucleotide?
 (A) Adenosine triphosphate (ATP) (B) Cytidine monophosphate (CMP)
 (C) Guanosine diphosphate (GDP) (D) Uracil pentaphosphate (UPP)

56. Which photosynthetic pigment is responsible for absorbing light energy in the green region of the spectrum?
 (A) Chlorophyll a (B) Chlorophyll b
 (C) Carotenoids (D) Phycobilins
57. Which type of immunity is characterized by anatomical barriers, inflammation, and soluble molecules?
 (A) Innate immunity (B) Adaptive immunity
 (C) Humoral immunity (D) Cell-mediated immunity
58. Which technique is used to detect the presence of a specific protein in a sample?
 (A) Western blotting (B) ELISA
 (C) Flow cytometry (D) Immunofluorescence
59. What is the turnover number of an enzyme?
 (A) The number of molecules of substrate converted to product per unit time per molecule of enzyme
 (B) The number of molecules of substrate converted to product per unit time
 (C) The rate constant of the enzyme-substrate complex formation
 (D) The substrate concentration at half-maximal velocity
60. What includes in the biosafety level 1?
 (A) Respiration protection is required (B) Full body suit
 (C) Biological safety cabinet (D) Laboratory coat, gloves
61. Which of the following process encourages grain germination?
 (A) Malting (B) Milling (C) Mashing (D) Boiling
62. What is the name of the first biotech company?
 (A) Genentech (B) Amgen (C) Biogen (D) Genzyme
63. What is the full form of RFLP?
 (A) Restriction Fragment Length Polymorphism
 (B) Recognition Fragment Length Polymorphism
 (C) Random Fragment Linear Polymorphism
 (D) Random Fragment Linear Polymorphism
64. If the D-value for a certain heat treatment is 4.5 minutes at 150°F, what would be the D-value at 160°F if the z-value is 10°F?
 (A) 0.45 minutes (B) 45 minutes (C) 0.9 minutes (D) 9 minutes
65. If there were 10,000 spores of a species in a can of food with D₂₄₀ of 1 minute what would be the F value at the same temperature?
 (A) 10 min (B) 12 min (C) 20 min (D) 24 min
66. Which of the following is used to count the number of cells?
 (A) Haemoglobinometer (B) Haemocytometer
 (C) Spectrophotometer (D) Flowcytometry
67. In which of the following methods microorganisms do not grow on the surface of the media?
 (A) Spread plate (B) Pour plate
 (C) Membrane filtration (D) Surface fermentation
68. Which of the following is not required in surface fermentation?
 (A) Aeration (B) Baffles (C) Agitation (D) Stirrer

69. What is the term used to describe the movement of solutes across a membrane from an area of lower concentration to an area of higher concentration with the input of energy?
- (A) Facilitated transport (B) Primary active transport
(C) Secondary active transport (D) Diffusion
70. What is the process of using microorganisms to convert organic materials into fuels and chemicals called?
- (A) Genetic engineering (B) Fermentation
(C) Bioremediation (D) Bioprocessing
71. What is the clonal nature of the immune response?
- (A) The immune response is generated by identical cells
(B) The immune response is generated by different cells
(C) The immune response is generated by multiple antigens
(D) The immune response is generated by soluble molecules
72. Which type of antibody is the most abundant in serum?
- (A) IgA (B) IgD (C) IgE (D) IgG
73. Which tool can be used for sequence similarity searches?
- (A) SRS (B) Entrez (C) FASTA (D) PCR
74. Which distribution is used to model the number of occurrences of rare events?
- (A) Binomial distribution (B) Poisson distribution
(C) Normal distribution (D) Exponential distribution
75. What is the Cartagena protocol on biosafety?
- (A) An international treaty to regulate biotechnology research
(B) A set of guidelines for the containment of hazardous materials
(C) A protocol for the safe transport of biological materials
(D) A protocol for the protection of biodiversity from the risks posed by living modified organisms

MSc(2Yr)(Forensic Science & Criminology)

GENERAL SCIENCE

1. Heating and pressure turns existing rocks into which of the following types?
(A) Igneous (B) Metamorphic (C) Sedimentary (D) Phreatomagmatic
2. Phenomenon explaining spreading of ink in water is
(A) Dipole movement (B) Osmosis (C) Solute kinetics (D) Diffusion
3. Which of the following galaxy is the nearest to the earth?
(A) Andromeda Galaxy (B) Milky Way
(C) Canis Major Dwarf (D) Sagittarius Dwarf Irregular Galaxy
4. Which of the following is the effective extinguisher for all confined fires?
(A) CO₂ (B) NO₂ (C) SO₂ (D) N₂O
5. Which of the following is not an organic acid
(A) Citric acid (B) Acetic acid (C) Boric acid (D) Valeric acid
6. What is the fear of snakes called?
(A) Arachnoph (B) Ophidiophobia (C) Nyctophobia (D) Ablutophobia
7. Which of the following is called the suicidal bags of a cell organelle?
(A) Mitochondria (B) Lysosomes
(C) Golgi apparatus (D) Endoplasmic reticulum
8. How many bones does a new born baby have?
(A) 310 (B) 206 (C) 306 (D) 300
9. Which of the following metals easily makes amalgam with other metals?
(A) Zinc (B) Mercury (C) Sodium (D) Lead
10. What is the function of Ribosomes?
(A) Photosynthesis (B) ATP Production
(C) Detoxification (D) Protein Synthesis
11. Which mirrors is generally used as rear-view mirror in vehicles?
(A) Concave mirror (B) Convex mirror
(C) Plain mirror (D) Combination of plane and convex mirror
12. Spherical shape of raindrops is due to which of the following reasons?
(A) Surface tension (B) Friction of air
(C) Falling from height (D) Viscosity factor
13. What is the expanded form of URL?
(A) Universal Resource Link (B) Unique Resource Locator
(C) Uniform Resource Locator (D) Uniform Resource Link
14. Which of the following is coldest layer of atmosphere?
(A) Exosphere (B) Stratosphere (C) Ionosphere (D) Mesosphere
15. The video browsing website 'YouTube' was launched in which year?
(A) 2000 (B) 2002 (C) 2005 (D) 2003
16. Look at this series: 12,11,13,12,14, 13..... What number should come next?
(A) 11 (B) 14 (C) 12 (D) 15

17. What is white vitriol?
 (A) Zinc sulfate (B) Zinc nitrate (C) Zinc carbonate (D) Zinc acetate
18. Where is the world's first solar powered based airport located?
 (A) Cochin (B) Bombay (C) Delhi (D) Hyderabad
19. Which word does not belong to others?
 (A) Glossary (B) Book (C) Chapter (D) Index
20. What is the expanded form of DRDO
 (A) Department of Research and Development Organisation
 (B) Department of Research and Defence Organisation
 (C) Defence Research and Development Organisation
 (D) Developmental Research in Defence Organisation

PHYSICS

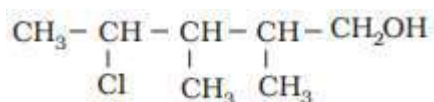
21. What is the value of I_E , if $\beta = 40$ and $I_B = 25\mu A$ in a transistor?
 (A) 2.3 mA (B) 1.5 mA (C) 1.025 mA (D) 2.5 mA
22. What are the conditions required for a nuclear fusion reaction to occur?
 (A) High pressure (B) High energy (C) High temperature (D) A and C
23. How can the threshold wavelength of a metal be determined if its work function is known to be 4.2 eV?
 (A) 2100 Å (B) 2300 Å (C) 2946 Å (D) 2743 Å
24. What is the self-inductance value of a coil if the induced EMF is 3.28 V when the current within the coil changes from 10 A to 2 A within 0.1 s?
 (A) 5 H (B) 0.2 H (C) 0.04 H (D) 1 H
25. What will be the new resistance of a wire that is stretched to 10% longer than its original length, if its initial resistance is 10 Ω ?
 (A) 10 Ω (B) 11 Ω (C) 12 Ω (D) 13 Ω
26. What is the reason for considering distance as a scalar quantity?
 (A) It has magnitude only (B) It has direction only
 (C) It has no magnitude (D) It has no direction
27. Which of the following statements is not true regarding the property of inertia exhibited by a body?
 (A) When hanging carpet is beaten with a stick, the dust particle starts coming out of it
 (B) When a tree is shaken vigorously, its fruits and leaves fall down
 (C) When a car or bus starts suddenly, the passengers fall backward
 (D) When a running car or bus stops suddenly, the passengers are jerked backward
28. What is the weight of an object on the moon compared to its weight on Earth?
 (A) One-sixth (B) One-third (C) Half (D) One-fourth
29. Which of the statements accurately describe the laws of reflection for light?
 (A) The incident sound wave, the reflected sound wave and the normal at the point of incident, all lie in a same plane.
 (B) The angle of reflection of sound is not equal to the angle of incidence of sound.

- (C) The incident sound wave, reflected sound wave, and normal at the point of incidence are not lie in a same plane.
- (D) The angle of reflection of sound is greater to the angle of incidence of sound.
30. What is the term used to describe sound or frequencies that are below 20 Hz?
(A) Ultrasonic sound (B) Infrasonic sound (C) Inaudible sound (D) Audible sound
31. How will the resistance of a wire be impacted if its diameter is increased threefold?
(A) Resistance will become one ninth the original
(B) Resistance will be halved
(C) Resistance will remain unchanged
(D) Resistance will increase three times
32. What component of an AC generator can be replaced to transform it into a DC generator?
(A) Permanent Magnet (B) Shaft (C) Slip Rings (D) Commutator
33. What would be the most suitable fuel source based on its calorific value?
(A) Fuel with Calorific Value 45 kJ/g (B) Fuel with Calorific Value 95 kJ/g
(C) Fuel with Calorific Value 1 kJ/g (D) Fuel with Calorific Value 4.5 kJ/g
34. What type of image is not formed when an object is placed at infinity from a convex mirror?
(A) Behind the mirror at focus (B) Virtual and erect
(C) Smaller than object (D) Greater than object
35. Which law of refraction is expressed by the formula $n = \frac{\sin i}{\sin r}$ where n is the refractive index of a medium and i and r are the angles of incidence and refraction, respectively?
(A) First law of reflection (B) Second law of reflection
(C) First law of refraction (D) Second law of refraction
36. What is the visual impairment that Rose is experiencing if she can read the number of a distant bus clearly but struggles to read a book comfortably?
(A) Hypermetropia (B) Myopia (C) Presbyopia (D) Cataract
37. What is the order of the angle of deviation produced by a prism for different colours of light from smallest to largest?
(A) Red < Blue < Yellow < Violet (B) Red < Violet < Yellow < Blue
(C) Red < Yellow < Blue < Violet (D) Violet < Red < Yellow < Blue
38. The value of drift velocity of electron varies between
(A) 0.01 to 0.1 cm s⁻¹ (B) 0.05 to 0.1 cm s⁻¹ (C) 0.1 to 1.0 cm s⁻¹ (D) 1 to 10 cm s⁻¹
39. What does a straight line with a downward slope on the speed-time graph of an object indicate?
(A) The particle is in free fall (B) The particle is in constant acceleration
(C) The particle is in uniform retardation (D) The particle is in constant speed
40. A bullet of mass 10 g is fired from a gun of mass 6 Kg with a velocity of 300 m/s. What will be the recoil velocity of gun?
(A) 1 m/s (B) 5 m/s (C) 0.1 m/s (D) 0.5 m/s

41. An object has been thrown vertically upward, with a speed of 15 m/s. How high will it go, before it starts to fall back?
 (A) +11.4 m (B) +9.8 m/s² (C) -11.4 m (D) -9.8 m/s²
42. If a positive point charge is placed outside a neutral conducting sphere, what will be the charge on the sphere?
 (A) Negative and distributed uniformly over the surface of the sphere
 (B) Negative and appears only at the point on the sphere closest to the point charge
 (C) Negative and distributed non-uniformly over the entire surface of the sphere
 (D) Zero
43. What is the sequence of energy conversion in a thermal power plant?
 (A) Kinetic Energy → Heat Energy → Chemical Energy → Electrical Energy
 (B) Chemical Energy → Kinetic Energy → Heat Energy → Electrical Energy
 (C) Chemical Energy → Heat Energy → Kinetic Energy → Electrical Energy
 (D) Electrical Energy → Heat Energy → Kinetic Energy → Chemical Energy
44. Three copper wires have mass ratio as 1 : 3 : 5 and length ratio as 5 : 3 : 1. What will be the ratio of their resistance?
 (A) 125 : 15 : 1 (B) 5 : 3 : 1 (C) 1 : 3 : 5 (D) 1 : 15 : 125
45. If $\vec{E}$ and $\vec{B}$ represent electric and magnetic field vectors of electromagnetic waves, the direction of propagation of electromagnetic waves will be along which of the following?
 (A) $\vec{E}$ (B) $\vec{E} \times \vec{B}$ (C) $\vec{B}$ (D) $\vec{B} \times \vec{E}$

CHEMISTRY

46. Which is not the condition for aromaticity according to Huckel's Law?
 (A) The molecule has to be cyclic (B) The molecule has to be planar
 (C) The molecule has to be fully conjugated (D) The molecule should have $4n, \pi$ electrons
47. Which of the following is not true for Lewis Acid?
 (A) They have incomplete octet of electrons
 (B) They act as electron donor
 (C) They act as electron acceptor
 (D) When bonding they use their Lowest Unoccupied Molecular Orbit (LUMO)
48. Friedel-Craft's alkylation proceeds in the presence of which chemical moiety?
 (A) Lewis acid (B) Lewis base (C) Peroxides (D) Sodium hydroxide
49. Which one is the weakest base among the given halides?
 (A) Cl^- (B) Br^- (C) F^- (D) I^-
50. At constant temperature the volume of a given mass of a dry gas is inversely proportional to, which of the following?
 (A) Temperature (B) Pressure (C) Vapor Pressure (D) No. of moles
51. Which option depicts the IUPAC names of following compound ?



- (A) 2,6-Dimethylphenol
 (B) 4-Chloro-2,3-dimethylpentan-1-ol
 (C) 2-Ethoxypropane
 (D) 1-Ethoxy-2-nitrocyclohexane
52. Which order is correct for “Ease of dehydration” of alcohol?
 (A) Primary > Tertiary > Secondary (B) Tertiary > Secondary > Primary
 (C) Primary > Secondary > Tertiary (D) None of these
53. Based on their pK_a values, which of the following order is correct for acids?
 (A) $\text{ClCH}_2\text{COOH} > \text{ClCH}_2\text{CH}_2\text{COOH} > \text{CH}_3\text{CH}_2\text{COOH} > \text{CF}_3\text{COOH}$
 (B) $\text{CF}_3\text{COOH} > \text{ClCH}_2\text{CH}_2\text{COOH} > \text{CH}_3\text{CH}_2\text{COOH} > \text{ClCH}_2\text{COOH}$
 (C) $\text{CF}_3\text{COOH} > \text{ClCH}_2\text{COOH} > \text{CH}_3\text{CH}_2\text{COOH} > \text{ClCH}_2\text{CH}_2\text{COOH}$
 (D) $\text{CF}_3\text{COOH} > \text{ClCH}_2\text{COOH} > \text{ClCH}_2\text{CH}_2\text{COOH} > \text{CH}_3\text{CH}_2\text{COOH}$
54. What is the potential difference between the two electrodes of a galvanic cell called?
 (A) Cell Potential (B) Nernst Potential
 (C) Reverse Potential (D) Cell Resistance
55. Electrical conductance through metals does not depend upon, which of the following?
 (A) Nature and structure of the metal (B) Number of valence electrons per atom
 (C) Temperature (D) Malleability
56. A reaction is found to have a rate constant of $k = 6.5 \times 10^{-14} \text{ s}^{-1}$. What is the half-life of the reaction?
 (A) $1.06 \times 10^{-14} \text{ sec}$ (B) $0.106 \times 10^{-13} \text{ sec}$ (C) $1.06 \times 10^{-13} \text{ sec}$ (D) $10.6 \times 10^{-13} \text{ sec}$
57. The phenomenon of filling of $4f$ before $5d$ orbital resulting in a regular decrease in atomic radii is called as?
 (A) Lanthanoid Contraction (B) Actenoid Contraction
 (C) Oxidation Contraction (D) Centroid Contraction
58. First law of thermodynamics is expressed by which of the equation?
 (A) $\Delta U = q - w$ (B) $S = K_b \ln \Omega$ (C) $\Delta U = q + w$ (D) $\Delta S = \delta Q/T$
59. Out of reaction, given below, which reaction has maximum Bond dissociation enthalpy?
 (A) $\text{CH}_4 \rightarrow \text{CH}_3 + \text{H}$ (B) $\text{CH}_3 \rightarrow \text{CH}_2 + \text{H}$
 (C) $\text{CH}_2 \rightarrow \text{CH} + \text{H}$ (D) $\text{CH} \rightarrow \text{C} + \text{H}$
60. According to Brönsted-Lowry theory the acid-base pair that differs only by one proton is called?
 (A) Complementary acid-base pair (B) Conjugate acid-base pair
 (C) Contemporary acid-base pair (D) Supplementary acid-base pair
61. Which of the following is the strongest acid on the basis of dissociation constant?
 (A) Hydrofluoric Acid (HF) (B) Nitrous Acid (HNO_2)

- (C) Acetic Acid (CH_3COOH) (D) Benzoic Acid ($\text{C}_6\text{H}_5\text{COOH}$)
62. Yellow color precipitate which is insoluble in dilute Acetic Acid is obtained during analysis Pb(II) ion in group 1 analysis, What is the chemical composition of yellow precipitate?
 (A) PbI_2 (B) PbCrO_4 (C) PbSO_4 (D) PbCl_2
63. Grignard reagent reacts with ketones to give;
 (A) 2° Carboxylic Acid (B) 3° Alcohol (C) Aldehyde (D) Enols
64. Which of the following is not a mandate condition for resonance?
 (A) All resonating structures must have the same arrangement of atomic nuclei
 (B) Energy of limiting structure should be same or nearly same
 (C) Resonating structure must be planer
 (D) Resonating structure can have different number of paired and unpaired electrons
65. What is represented by “(+)” in D (+)-glucose?
 (A) Levorotatory nature of the molecule (B) Dextrorotatory nature of the molecule
 (C) Configuration of a particular stereoisomer (D) Chirality of the molecule
66. Bond between glucose and fructose in sucrose is known as?
 (A) Ionic Bond (B) Covalent bond
 (C) Hydrogen Bond (D) Glycosidic Linkage
67. What will happen to the solubility of NaCl, if HCl gas is passed through a saturated solution of NaCl?
 (A) Increase (B) Decrease
 (C) Does not change (D) NaCl gets decomposed
68. According to valence bond theory, what will be the shape of sp^3d hybridized?
 (A) Trigonal bipyramidal (B) Square planar
 (C) Tetrahedral (D) Octahedral
69. Two solutions having the same osmotic pressure at a given temperature are known as?
 (A) Hypertonic solutions (B) Isotonic solutions
 (C) Hypotonic Solution (D) Homogenous Solution
70. Violet colored vapors that turn blue or violet starch paper are observed by the action of Con. H_2SO_4 during analysis of anion in group analysis, What is indicated by this observation?
 (A) Br^- May be present (B) Cl^- May be present
 (C) I^- May be present (D) F^- May be present

BIOLOGY

71. How much is the net production of ATP in glycolysis?
 (A) 10 (B) 6 (C) 12 (D) 4
72. Which law was given by Raymond Lindeman for energy transfer in food chain/ecosystem?
 (A) 20% law (B) 10% law (C) 40% law (D) 30% law
73. A simple multicellular freshwater animal having tentacles, usually reproduce by which

process?

- (A) Binary fission (B) Formation of spores
(C) Budding (D) Fragmentation
74. Which of the following helps in maintaining posture and balance of human body?
(A) Cerebrum (B) Medulla (C) Cerebellum (D) Pons
75. Sleeping movements of leguminous plants are called
(A) Tropical (B) Twining (C) Winding (D) Nastic
76. Which of the following does not represent involuntary action?
(A) Vomiting (B) Heart beat (C) Chewing (D) Salivation
77. Which of the following terms depict the 'Empty glumes'?
(A) Petals (B) Carpels (C) Bracts (D) Stamens
78. What is the internal energy reserve in heterotrophs
(A) Glycogen (B) Starch (C) Protein (D) Fatty acid
79. Which of the following contain Endolymph?
(A) Synovial cavity (B) Internal ear
(C) Cnidoblasts (D) Posterior chamber of eye
80. When anther and stigma mature together, what it is known as?
(A) Allogamy (B) Homogamy (C) Xenogamy (D) Dichogamy
81. Mitochondria are the seat of which of the following?
(A) Anaerobic respiration (B) Formation of lysosomes
(C) Calvin cycle (D) Oxidative phosphorylation
82. Which of the following represent the Satellite DNA?
(A) Extra chromosomal DNA (B) Ribosomal RNA genes
(C) Single gene region (D) Short repetitive nucleotide sequences
83. Which bacteria are present in the nodes of leguminous plants?
(A) N_2 producing bacteria (B) Denitrifying bacteria
(C) N_2 fixing bacteria (D) Nitrifying bacteria
84. What is the study of animal in relation to its environment called?
(A) Autecology (B) Ecology (C) Ethology (D) Synecology
85. Which of the following depict the increase in oil production?
(A) Blue revolution (B) White revolution
(C) Golden revolution (D) Yellow revolution
86. Which physical phenomenon governs the movement of water from soil up to xylem?
(A) Ionic concentration in water (B) Turgor pressure
(C) Suction pressure (D) Degree of imbibition
87. In buccal cavity, saliva carries which of the following conversion?
(A) Fats to Vitamins (B) Sugar to Maltose
(C) Glycogen to Glucose (D) Protein to Amino acids

88. What is the common factor that contribute to the contamination of river water?
 (A) The presence of coliform bacteria in river water
 (B) Measurement of salt content of river water
 (C) The presence of fungi in river water
 (D) The presence of algae in river water
89. Which term is used to describe the space between two neurons?
 (A) Axon (B) Synapse (C) Dendrite (D) Impulse
90. Which of the following is Sex linked inheritance?
 (A) Cretinism (B) Anaemia (C) Color blindness (D) Gigantism
91. Deficiency of Vitamin E is root cause of which of the following?
 (A) Beri-Beri (B) Rickets (C) Blood clotting (D) Sterility
92. Which gland secretes the fluid that provides nutrients to the sperm?
 (A) Seminal vesicle (B) Vas deferens (C) Epididymis (D) Scrotum
93. Which statement is true about translocation?
 (A) The transport of water from leaves to stem
 (B) The transport of growth hormone from root to leave
 (C) The transport of food from root to stem
 (D) The transport of food from leave to other parts of plant
94. How the high concentration of auxin (more than optimal) will affect the plant growth?
 (A) Kill the plant (B) Inhibits plant growth
 (C) Cause chlorosis (D) No effect on plant
95. Which organism is causative agent for small pox disease?
 (A) Virus (B) Bacteria (C) Protozoa (D) Flagellate

FORENSIC SCIENCE

96. Who is the person recognized for giving the blood grouping system?
 (A) Henry (B) Burrard (C) Landsteiner (D) Curry
97. Which section of the IPC pertains to punishment for murder?
 (A) IPC-210 (B) IPC-302 (C) IPC-299 (D) IPC-300
98. Which situation does not require the determination of sex?
 (A) Murder (B) Heirship (C) Divorce (D) Marriage
99. Who is father of forensic toxicology?
 (A) Bertillon (B) Mathieu Orfila (C) Osborn (D) McCrone
100. What is the search method employed in investigating a crime scene?
 (A) Strip or Line (B) Grid (C) Spiral (D) All of these
101. What is the purpose of using the chilotic line in identification?
 (A) Determination of age (B) Determination of sex
 (C) Determination of height (D) Both A and C

102. When a forensic scientist determine the chemical composition of a substance that may contain illicit drugs such as heroin, cocaine, or opiates, this is an example of which of the following?
 (A) Individualization (B) Classification (C) Identification (D) Comparison
103. Who discovered blood grouping can be used for individual identification?
 (A) Leon Lattes (B) Carl Lattes (C) Gregor Lattes (D) Antonie Van
104. Who authored the very first forensic science novel based on Sherlock Holmes character?
 (A) Sir Arthur Holmes Doyle (B) Sir Arthur Conan Doyle
 (C) Sir Arthur Walker Doyle (D) Sir Arthur Brown Doyle
105. Where was the first forensic science lab established in India?
 (A) Delhi (B) Hyderabad (C) Chandigarh (D) Kolkata
106. Dbgjdg Magnan's sign is associated with addition of which of the following drugs?
 (A) LSD (B) Cocaine (C) Heroin (D) Cannabes
107. What is the origin of the term "forensic science"?
 (A) Greek word Forensis (B) Latin word Forensis
 (C) American word Forensis (D) English word Forensis
108. Dermal ridge characteristics used for comparison of fingerprints are also called which of the following?
 (A) Henry's details (B) Fauld's details (C) Galton's details (D) Vucetich's details
109. Bertillon developed which of following methods of personal identification?
 (A) Lip print (B) Fingerprint (C) Foot print (D) Anthropometry
110. What is the term used for a wound made by a surgeon?
 (A) Iatrogenic wound (B) Incised wound (C) Defence wound (D) Offensive wound
111. What is major component of Molotov cocktail?
 (A) Gasoline (B) Ethyl alcohol (C) Lead azide (D) Valine
112. Which of the following gas is not suitable in gas chromatography technique?
 (A) Hydrogen (B) Argon (C) Helium (D) Oxygen
113. Which antidote is used in methanol poisoning?
 (A) Ethanol (B) Ethylene glycol (C) Chloroform (D) Oxalic acid
114. Which of the following is the cause of 'Hooch Tragedy'.
 (A) Ethanol (B) Acetic acid (C) Methanol (D) Butanol
115. Analytical pyrolysis gas chromatography has been a standard method for analysis of which of the following?
 (A) Paint (B) Glass (C) Cement (D) Soil
116. Which one of these is not helpful in individualization?
 (A) Bite Mark (B) Tear Stain (C) Sweat Stain (D) Amniotic fluid

117. Which colour test is used for examination of saliva?
- (A) Starch iodine test (B) Lugel's iodine test
(C) Calorimetric test (D) D-dimer test
118. Which statement is correct for 'Asphyxia'?
- (A) Anaemia due to the sudden and excessive haemorrhage from wounds of large blood vessels
(B) Mechanical obstruction of the air passage
(C) Compression of the brain or its membrane
(D) B and C both
119. Which term is correct for 'Suicidal injuries'?
- (A) Received by victim mostly on hands
(B) Caused by self
(C) Fatal wounds on chest, abdomen, head and would not include non-fatal defense wound
(D) Hesitation cut
120. For personal identification from skeletonized human remains, which of the following is not of potential use?
- (A) Surgical implants (B) Dental anomalies
(C) Tattoos (D) Bone disorder

x-x-x

MSc(HS/2Yr)(Biotechnology)

1. Which form is assumed by a RNA- DNA hybrid in a solution
(A) A form (B) B form (C) C form (D) Z form
2. Most proteins will have net positive charge under which of the following conditions
(A) In a buffer with pH below its pI (B) In a buffer with pH above its pI
(C) In the presence of SDS (D) In the presence of mercaptoethanol
3. What change will you see in an organic acid on addition to a solution with pH less than its pKa
(A) It will get protonated and exist in an undissociated form
(B) It will get deprotonated and exist in a dissociated form
(C) Its conjugate base and conjugate acid will be in equal concentration
(D) It will remain unaffected by pH of the solution
4. Which of the following changes in a gene will go undetected on electrophoresis of protein produced by that gene?
(A) Missense mutation (B) Nonsense mutation
(C) Addition of nucleotides (D) Deletion of nucleotides
5. Precise folding pattern of a protein can be obtained by all except
(A) X- ray crystallography (B) NMR spectroscopy
(C) Tandem mass spectrometry (D) Cryo electron microscopy
6. Which of the following is not a Database for proteins
(A) TrEMBL (B) UniProt (C) SwissProt (D) DDBJ
7. Which statement is not correct for domains in proteins
(A) They can be used for classification of proteins
(B) They help in functional annotation of a protein
(C) They are independently stable functional units of a protein
(D) There cannot be more than one domain in a polypeptide
8. Which statement is not true for CRISPR Technology
(A) It provides immunity to bacteria against phage infection
(B) It can be used for the detection of pathogens
(C) It is based on RNA guided sequence specific DNA cleavage by Cas 9
(D) It is a powerful tool to knock out and insert genes in bacteria but not in plants
9. All the statement regarding yeast integrative plasmid are true except
(A) It is a high copy number plasmid

- (B) It does not contain 2 μ plasmid origin of replication
- (C) It shows mendelian segregation
- (D) It is most suited for the expression of gene encoding toxic protein

10. Which statement is incorrect regarding gene expression

- (A) Sigma factor 70 allows the *E.coli* core RNAP to initiate RNA synthesis from specific bacterial and phage promoters
- (B) Prokaryotes synthesize different RNA species using different RNA polymerases
- (C) Eukaryotic cells are unable to initiate transcription without transcription factors
- (D) Nucleosomes prevent the transcription of genes in eukaryotic cells

11. Choose the incorrect statement

- (A) Telomerase is a ribonucleoprotein with reverse transcriptase activity
- (B) Telomerase is over expressed in cancer cells
- (C) Telomerase activity leads to cellular senescence
- (D) Telomerase maintains the length of telomeres in undifferentiated cells

12. Differential gene expression cannot be studied by which of the following techniques

- (A) Microarray
- (B) Transcriptome analysis
- (C) Multiplex PCR
- (D) Real Time PCR

13. Which of the following pairs have not been matched correctly

- | | |
|------------------------------|----------------|
| 1. Elizabeth Helen Blackburn | RNA structure |
| 2. Jennifer Doudna | Genome editing |
| 3. Rosalind Franklin | Telomerase |
| 4. Barbra McClintock | Jumping genes |

- (A) 1 and 2
- (B) 2 and 3
- (C) 1 and 4
- (D) 1 and 3

14. Colchicine arrests the replicating chromosomes in which phase of cell division

- (A) Interphase
- (B) Metaphase
- (C) Anaphase
- (D) Telophase

15. Which statement describes lambda phage the best

- (A) Double strand linear DNA genome and a temperate phage of *E.coli*
- (B) Double strand RNA genome and temperate phage of *E.coli*
- (C) Single strand DNA genome that exists as prophage in *E.coli*
- (D) Double strand circular DNA genome and lytic phage of *E.coli*

16. Bacteria that lack cell wall are classified as

- (A) Firmicutes
- (B) Mollicutes
- (C) Archaea
- (D) Proteobacteria

17. *E.coli* grown on a medium containing glucose and lactose will show

- (A) Exponential growth
- (B) Diphasic growth

- (C) Diauxic growth (D) Arithmetic growth
18. Which of the following is not common in prokaryotes and eukaryotes
- (A) Bidirectional DNA synthesis
(B) Multiple origins of DNA replication
(C) Involvement of topoisomerase in replication of DNA
(D) Unwinding of DNA helix by breaking and rejoining the strands of DNA by helicase
19. Which features can differentiate archae bacteria from eubacteria
1. Glycolytic and citric acid pathway
 2. Absence of peptidoglycan in cell wall
 3. Ether linked lipids in cell membrane
 4. Phototrophic mode of nutrition
- (A) 1 and 3 (B) 2 and 3 (C) 3 and 4 (D) 2 and 4
20. Delayed hypersensitivity is characterized by
- (A) Immune response to an allergen
(B) Activation of cytotoxic T cells and infiltration of macrophages
(C) Infiltration of mast cells and their degranulation
(D) Infiltration of neutrophils and cytotoxic T cells
21. Which of the following is a characteristic of apoptosis
- (A) Nuclear condensation (B) Random digestion of DNA
(C) Acute inflammation (D) Activation of Bcl2 family of proteins
22. Activation of cellular oncogenes is unlikely to happen by which of the following
- (A) Point mutation (B) Gene amplification
(C) Chromosome translocation (D) Promoter CpG methylation
23. Which of the following are true for IgG
1. Can cross placenta
 2. Primary antibody
 3. Fix complement
 4. Act as B cell receptor
- (A) 1 and 2 (B) 1 and 3 (C) 3 and 4 (D) 2 and 4
24. Mark the incorrect statement
- (A) B cells recognize the soluble antigens
(B) B and T cells produce antibodies against proteins and polysaccharides antigens
(C) CAR T cells can bind and kill cancer cells
(D) T cells recognise processed antigens displayed by MHC
25. Viral ras oncogene that can cause transformation of normal cell to cancer cell has

- (A) Reduced ATPase activity (B) Increased ATPase activity
(C) Reduced GTPase activity (D) Increased GTPase activity

26. For an enzyme catalyzed reaction mark the correct statement

- (A) In feedback inhibition, the product acts as the competitive inhibitor of the enzyme
(B) In competitive inhibition, the product binds to the substrate of enzyme
(C) Allosteric inhibitors bind to the enzyme at the active site
(D) Non competitive inhibitors bind to enzyme but not at the active site

27. The pentose phosphate pathway in the oxidative phase produces all except

- (A) Ribulose- 5 phosphate (B) 6 -phosphogluconate
(C) Fructose- 6 phosphate (D) NADPH

28. Base excision repair involves the participation of enzymes in which sequence

- (A) Glycosylase, endonuclease, polymerase and ligase
(B) Endonuclease, glycosylase, polymerase and ligase
(C) Endonuclease, 5'-3' exonuclease, polymerase and ligase
(D) Restriction endonuclease, polymerase and ligase

29. Double strand DNA break that occurs shortly after its replication can be fixed by

- (A) Non-homologous end joining (B) Homologous recombination
(C) Mismatch repair (D) SOS repair

30. Which of the following fusion tags would be suitable for purification and enhanced solubility of heterologous proteins produced in *E.coli*

- (A) His tag (B) myc tag
(C) Green Fluorescent Protein tag (D) Maltose Binding Protein tag

31. If a mixture of proteins is applied on sephadex G200 column which protein will be eluted in the end

- (A) 20 kD (B) 80 kD (C) 250 kD (D) 450 kD

32. Primer dimers in PCR amplification are formed because of

- (A) Wrong sequence of primer pair (B) Complementary sequences at the 5' ends
(C) Complementary sequences at the 3' ends (D) High annealing temperature

33. Which statements are correct with respect to ion exchange chromatography

1. Proteins with negative charge will bind to the anion exchanger
 2. Proteins with negative charge will bind to the cation exchanger
 3. Proteins with positive charge will bind to the anion exchanger
 4. Protein with positive charge will bind to the cation exchanger
- (A) 1 and 2 (B) 1 and 4 (C) 2 and 4 (D) 3 and 4

34. The sequence of enzymes required for labelling of DNA by Nick translation is
 (A) DNase 1, 5'-3' Exonuclease, 5'-3' DNA polymerase
 (B) 5'-3' Exonuclease, DNase1, 5'-3' DNA polymerase
 (C) S1 Nuclease, 5'-3' Exonuclease, 5'-3' DNA polymerase
 (D) S1 Nuclease, 3'-5' Exonuclease, 5'-3' DNA polymerase
35. Production of biogas from organic waste by anaerobic bacteria follows three steps in the sequence
 (A) Hydrolysis, methanogenesis and acidogenesis
 (B) Acidogenesis, hydrolysis and methanogenesis
 (C) Reduction, acidogenesis and methanogenesis
 (D) Hydrolysis, acidogenesis and methanogenesis
36. The 2023 UN climate change conference (COP28) is scheduled to be held in
 (A) India (B) Dubai (C) France (D) Germany
37. Mark the incorrect statement
 (A) Activated sludge process is a secondary treatment of wastewater
 (B) Secondary treatment reduces BOD of waste water
 (C) Secondary treatment involves chlorination to kill pathogens
 (D) Secondary treatment involves microbial degradation under aerobic conditions
38. Metal mining from sulphur containing ores is carried out by
 (A) Acidophilic chemolithotropic bacteria (B) Acidophilic heterotrophic bacteria
 (C) Alkalophilic heterotrophic fungi (D) Alkalophilic chemotropic fungi
39. Which of the following enzymes is not associated with microbial detoxification of xenobiotics
 (A) Cytochrome P450 (B) Esterase
 (C) Laccase (D) Xylanase
40. Which gases does not lead to global warming because of its greenhouse effect
 (A) Carbon dioxide (B) Water vapors
 (C) Nitrogen (D) Hydrofluorocarbons
41. Which statement is incorrect regarding the Fo/F1 ATPase system
 (A) It is present in eubacteria and fungi
 (B) It catalyses the hydrolysis of ATP
 (C) It is involved in the synthesis of ATP
 (D) It is present in cell membrane of Mitochondria, Chloroplasts and peroxisomes
42. Capping of mRNA is involved in all except

- (A) Efficient pre-mRNA splicing
- (B) Nuclear export of mRNA
- (C) Initiation of protein synthesis
- (D) Stability of transcript through miRNA

43. Mark the incorrect statement

- (A) N-formyl methionine is encoded by AUG in prokaryotes
- (B) No separate tRNA exists for formyl methionine
- (C) Methionine tRNA adds methionine to the internal AUG codon
- (D) Deformylase present on ribosome removes formylmethionine from the nascent protein

44. Which of the following statements is false

- (A) Integrins in desmosomes mediate cell attachment to basement membrane
- (B) Integrins regulate cell survival and proliferation
- (C) Integrins help in adherence of cells to extracellular matrix glycoproteins
- (D) Integrins are the main receptors of extracellular matrix molecules

45. Which of the following proteins does not have intrinsic catalytic activity

- (A) Tyrosin kinase receptor
- (B) Serine kinase receptor
- (C) Threonine kinase receptor
- (D) G protein coupled receptor

46. Beta oxidation of fatty acids occurs in

- (A) Mitochondria
- (B) Peroxisome
- (C) Mitochondria and peroxisome
- (D) Endoplasmic reticulum

47. Superoxide dismutase is present in all except

- (A) Obligate aerobes
- (B) Obligate anaerobes
- (C) Facultative anaerobes
- (D) Microaerophiles

48. Which toxin due to its protease activity does not allow the release of acetyl choline

- (A) Diphtheria toxin
- (B) Cholera toxin
- (C) Tetanus toxin
- (D) Botulinum toxin

49. Pasteurization of milk leads to which of the following

1. Inactivation of alkaline phosphatase
2. Sterilization of milk
3. Killing of bacterial spores
4. Killing of pathogens in milk

- (A) 1 and 2
- (B) 2 and 3
- (C) 3 and 4
- (D) 1 and 4

50. Digestion of which protein by rennin leads to curdling of milk

- (A) Alpha casein
- (B) Beta casein
- (C) Kappa casein
- (D) Para casein

51. Mark the organism that is not used as a probiotic

- (A) *Lactobacillus casei*
- (B) *Saccharomyces boulardii*
- (C) *Streptococcus thermophilus*
- (D) *Kluyveromyces cerevisiae*

52. *Clostridium botulinum* spore germination is inhibited in cured meat products by
 (A) Sodium alginate (B) Sodium nitrite
 (C) Ascorbic acid (D) Lactic acid
53. The presence and multiplication of bacteria in blood is termed as
 (A) Septicemia (B) Bacteremia
 (C) Secondary infection (D) Acute infection
54. Vaccine is available against all except
 (A) Human papillomavirus (B) Human immunodeficiency virus
 (C) Hepatitis A virus (D) Influenza virus
55. Black fungus infection in Covid-19 patients was caused by
 (A) *Aspergillus* (B) *Candida* (C) *Trichoderma* (D) *Rhizopus*
56. Select the mismatched pairs regarding SARS CoV 2 vaccine
- | | |
|-------------------------------------|-----------------------------|
| 1. Bharat Biotech Covishield | Inactivated virus vaccine |
| 2. Serum Institute of India Covaxin | mRNA vaccine |
| 3. Moderna Pfizer-BioNtech | Recombinant subunit vaccine |
| 4. ZycoV-D | Indigenous DNA vaccine |
- (A) 1 and 2 (B) 2 and 3 (C) 3 and 4 (D) 1 and 4
57. How many fragments are expected if the human genome (3×10^9 bp per haploid genome, GC content 50%) is digested with *Sau3A* that cuts at GATC
 (A) 3×10^4 (B) 12×10^6 (C) 2×10^7 (D) 7.5×10^8
58. How is it possible to screen for a clone that carries the gene of interest on the vector but there is no expression?
 (A) Colony hybridization (B) Immunochemical method
 (C) Functional screening (D) Northern hybridization
59. Mark the incorrect statement
 (A) cDNA clones do not have introns in the genes encoded
 (B) cDNA library does not represent all the genes present in a genome
 (C) cDNA clones contain promoter sequences for expression of the genes encoded
 (D) cDNA library preparation requires both reverse transcriptase and DNA polymerase I
60. GM mustard developed in India contains genes that
 (A) Prevent self pollination
 (B) Confer pest and herbicide tolerance
 (C) Confer resistance to pest
 (D) Prevent both self pollination and herbicide tolerance

61. In case of cross contamination of cell lines, the authentication can be done by all except
 (A) Cytogenetic analysis for karyotyping (B) Isozyme analysis using PAGE
 (C) Gene amplification by PCR (D) Short Tandem Repeat (STR) profiling
62. IPTG induces the lac operon as it overcomes
 (A) The negative control of lac operon by binding the repressor
 (B) The negative control by binding the allolactose
 (C) Positive control by binding to catabolite activator protein
 (D) Positive control by depressing cAMP concentration
63. Mark the correct statements regarding Expressed Sequence Tags
 1. These are used to identify full length genes
 2. These are used for mapping of Human Genome
 3. These are 900 to 1000 nucleotides in length
 4. These are highly polymorphic
 (A) 1 and 2 (B) 1 and 4 (C) 2 and 4 (D) 3 and 4
64. Which of the following statements is incorrect regarding ubiquitination
 (A) Ubiquitination of proteins is exclusively done in eukaryotic cells
 (B) Misfolded proteins are poly ubiquitinated to be destroyed by proteasome
 (C) Mono ubiquitination of the denatured proteins leads to proteasomal degradation
 (D) Strong transcription factors are regulated by ubiquitination
65. DNA polymerase I of eubacteria participates in all activities except
 (A) SOS repair (B) Excision repair
 (C) Removal of RNA primers (D) Lagging strand replication
66. Which of the following events is not sufficient to cause evolution of new genes
 (A) Horizontal gene transfer between different species
 (B) Spontaneous mutation of genes to create new function
 (C) Shuffling of domains of genes by rearrangement
 (D) Formation of new genes *de novo* from non coding DNA in the genome
67. Which of the following is not a secondary messenger
 (A) cAMP (B) Inositol triphosphate
 (C) Diacylglycerol (D) Gamma-amino butyric acid
68. Which of the following extracellular signal molecule uses cell surface receptor to regulate gene expression
 (A) Cortisol (B) Thyroxine
 (C) Epidermal growth factor (D) Nitric oxide

69. During oxidative phosphorylation in mitochondria, ubiquinone a mobile electron carrier, transfers electrons from
- (A) NADH dehydrogenase complex to cytochrome b-c1 complex
 - (B) Cytochrome b-c1 complex to NADH dehydrogenase complex
 - (C) Cytochrome b-c1 complex to cytochrome oxidase complex
 - (D) NADH dehydrogenase complex to cytochrome oxidase complex
70. Which kinase catalyses reversible reaction yielding ATP during glycolysis
- (A) Hexokinase
 - (B) Pyruvate kinase
 - (C) Phosphofructokinase
 - (D) Phosphoglycerate kinase
71. The membrane channel proteins in the selectively permeable lipid bilayer choose solute on the basis of their
- (A) Size
 - (B) Charge
 - (C) Size and charge
 - (D) Binding to solute binding site
72. Which statements reflects the function of eukaryotic DNA polymerase alpha
- (A) It elongates the leading strand of DNA during replication
 - (B) It makes primers for both lagging and leading strands
 - (C) It replicates mitochondrial DNA
 - (D) It is involved in DNA repair
73. Which of the following substances can exclusively pass through plasmodesmata but not the gap Junction
- (A) Glutamic acid
 - (B) cAMP
 - (C) Calcium ions
 - (D) Phosphatidylcholine
74. Xeroderma pigmentosa is an autosomal recessive disorder that is associated with all except
- (A) Deficiency in nucleotide excision repair
 - (B) Development of malignant skin tumour
 - (C) Deficiency of enzyme for degradation of phenylalanine
 - (D) Deficiency of vitamin D
75. Cyclins in association with CDKs regulate the cell cycle. In case of DNA damage, cell cycle progression to S phase will be blocked by preventing the accumulation of
- (A) Cyclin D and CDK4
 - (B) Cyclin E and CDK2
 - (C) Cyclin A and CDK2
 - (D) Cyclin B and CDK1

x-x-x

MSc(HS/2Yr)(Botany)

1. When is the International Day for Biological Diversity celebrated?
(A) 22nd April (B) 22nd May (C) 22nd March (D) 2nd February
2. Which of the following does not pertain to the *r*-selected species?
(A) Small body size (B) Good dispersal ability
(C) High reproductive rate (D) Strong Competitive ability
3. Lianas are _____.
(A) Tree ferns (B) Wood rotting fungi
(C) Epiphytic mosses (D) Woody climbers
4. Which of the following terms is used for a wetland ecosystem dominated by trees?
(A) Marsh (B) Swamp (C) Estuary (D) Fen
5. Which of the following is not true about ecotones?
(A) Are highly prone to disturbance (B) Show edge effect
(C) Have poor species diversity (D) Estuaries are an example of ecotones
6. Who among the following coined the term Nekton?
(A) Charles Darwin (B) Victor Hensen
(C) Ernst Haeckel (D) Charles Elton
7. Which of the following is the current version of the International Code of Nomenclature for Algae, Fungi, and Plants?
(A) Vienna code (B) Paris code (C) Shenzhen code (D) Melbourne code
8. Who is known as the *Father of Phytogeography*?
(A) Charles Darwin (B) Alfred Russel Wallace
(C) Augustin de Candolle (D) Alexander von Humboldt
9. UN has recognized year 2023 as the International Year of _____.
(A) Forages (B) Millets (C) Cucurbits (D) Legumes
10. Which of the following Pteridophytes is homosporous?
(A) *Salvinia natans* (B) *Lycopodium clavatum*
(C) *Selaginella lepidophylla* (D) *Isoetes coromandeliana*
11. Which of the following Pteridophytes is commonly known as resurrection plant?
(A) *Stylites* (B) *Selaginella* (C) *Lycopodium* (D) *Isoetes*
12. Pseudo-elaters are found in which of the following Pteridophytes?
(A) *Lycopodium* (B) *Equisetum* (C) *Selaginella* (D) *Isoetes*

13. Which of the following is the botanical name of hemp?
 (A) *Crotalaria juncea* (B) *Apocynum cannabinum*
 (C) *Corchorus capsularis* (D) *Cannabis sativa*
14. Who coined the term Biosphere?
 (A) Eduard Suess (B) Arthur Tansley
 (C) Vladimir I. Vernadsky (D) Charles Darwin
15. Lloyd's Botanical Garden is located in which of the following Indian states?
 (A) Uttarakhand (B) Sikkim (C) West Bengal (D) Kerala
16. Which of the following parts of clove is used as flavouring material?
 (A) Dried leaves (B) Dried seeds (C) Dried floral buds (D) Dried roots
17. Which of the following is the source of Gum Tragacanth?
 (A) *Anogeissus latifolia* (B) *Aegle marmelos*
 (C) *Astragalus gummifer* (D) *Sterculia urens*
18. *Solanum tuberosum* is native to which of the following regions?
 (A) Central Asia (B) South America (C) South Africa (D) Southeast Asia
19. Which of the following is the type of fruit found in oranges?
 (A) Capsule (B) Pepo (C) Pome (D) Hesperidium
20. Plant populations exhibiting non-heritable morphological changes in response to changing environment are referred to as _____.
 (A) Ecotopes (B) Ecophenes (C) Ecotypes (D) Ecotone
21. *Crocus sativus* belongs to which of the following families?
 (A) Malvaceae (B) Acanthaceae (C) Iridaceae (D) Scrophulariaceae
22. Which of the following terms is applied to the long fibre of cotton seed?
 (A) Linen (B) Coir (C) Lint (D) Fuzz
23. Motile stage is absent in which of the following algae?
 (A) *Vaucheria* (B) *Volvox*
 (C) *Batrachospermum* (D) *Fucus*
24. *Pinus gerardiana* is characteristic tree of which of the following type of forests?
 (A) Himalayan dry temperate forests (B) Sub-tropical pine forests
 (C) Montane Wet Temperate forests (D) Dry alpine scrubs
25. Which of the following is the largest National Park of India?
 (A) Periyar National Park (B) Jim Corbett National Park
 (C) Kaziranga National Park (D) Hemis National Park
26. Apogamy in ferns was reported for the first time by _____.
 (A) Farlow (B) Bower (C) Druery (D) Sporne

27. Which of the following terms refers to a medullated stele?
 (A) Siphonostele (B) Haplostele (C) Actinostele (D) Plectostele
28. Which of the following is the common name of Bird's Nest Fern?
 (A) *Pteridium aquilinum* (B) *Asplenium nidus*
 (C) *Ophioglossum vulgatum* (D) *Dryopteris filix-mas*
29. Which of the following is the causal organism of loose smut of wheat?
 (A) *Alternaria tritici* (B) *Urocystis agropyri*
 (C) *Ustilago tritici* (D) *Tilletia indica*
30. Sex organs in *Chara* are _____.
 (A) Multicellular and jacketed (B) Multicellular and non-jacketed
 (C) Unicellular and non-jacketed (D) Unicellular and jacketed
31. Which of the following algae is the source of Carrageenin?
 (A) *Fucus vesiculosus* (B) *Sargassum muticum*
 (C) *Saccharina japonica* (D) *Chondrus crispus*
32. Which of the following mosses is commonly known as Cord Moss?
 (A) *Mnium hornum* (B) *Funaria hygrometrica*
 (C) *Physcomitrella patens* (D) *Bartramia pomiformis*
33. *Porella* is an example of _____.
 (A) Moss (B) Thallose liverwort
 (C) Leafy liverwort (D) Hornwort
34. Which of the following amino acids is aromatic in nature?
 (A) Tryptophan (B) Glycine (C) Glutamic acid (D) Alanine
35. Which of the following terms is used for the plastids that store and synthesize lipids?
 (A) Chromoplasts (B) Amyloplasts (C) Elaioplasts (D) Etioplasts
36. Glyoxylate cycle takes place in _____.
 (A) Mitochondria (B) Peroxisomes (C) Chloroplasts (D) Ribosomes
37. Puffballs are a type of _____.
 (A) Brown algae (B) Red algae (C) Fungi (D) Green algae
38. Which of the following gymnosperms is a source of anti-cancerous drug Paclitaxel?
 (A) *Pinus wallichiana* (B) *Taxus brevifolia*
 (C) *Taxodium distichum* (D) *Picea smithiana*
39. Which of the following type of ovules is found in Gymnosperms?
 (A) Orthotropous (B) Anatropous (C) Amphitropous (D) Circinotropous
40. Basal meristem is found in which of the following bryophytes?
 (A) *Anthoceros* (B) *Sphagnum* (C) *Riccia* (D) *Funaria*

41. In which of the following systems of classification, Gymnosperms are placed between Dicots and Monocots?
 (A) Engler and Prantl (B) Takhtajan
 (C) Huthcinson (D) Bentham and Hooker
42. Inferior ovary is found in which of the following plants?
 (A) Marigold (B) Basil (C) Mustard (D) Brinjal
43. Citrus canker is caused by _____.
 (A) Rod-shaped gram positive bacterium (B) Rod-shaped gram negative bacterium
 (C) Virus (D) Mycoplasma
44. Gynostegium is present in the flower of _____.
 (A) *Aster* (B) *Malvastrum* (C) *Nerium* (D) *Calotropis*
45. In which of the following members of family Malvaceae, epicalyx is absent?
 (A) *Alcea* (B) *Abelmoschus* (C) *Hibiscus* (D) *Abutilon*
46. Tetradynamous stamens are found in _____.
 (A) *Cucumis sativus* (B) *Brassica campestris*
 (C) *Ocimum sanctum* (D) *Citrus aurantiifolia*
47. Ovary is obliquely placed in which of the following families?
 (A) Solanaceae (B) Ranunculaceae (C) Rutaceae (D) Malvaceae
48. Which of the following is not true about Tobacco Mosaic Virus?
 (A) It was the first virus to be discovered
 (B) It is single stranded RNA virus
 (C) It has a rod like appearance
 (D) The virus was crystallized by Adolf Mayer
49. Secondary growth is absent in _____.
 (A) Carrot taproot (B) Potato tuber
 (C) Maize (D) Tuberous roots of sweet potato
50. Which of the following Gymnosperms is commonly known as maidenhair tree?
 (A) *Araucaria bidwelli* (B) *Ginkgo biloba*
 (C) *Abies pindrow* (D) *Cycas beddomei*
51. Which of the following is an example of amphibolic biochemical pathway?
 (A) Glycolysis (B) β -oxidation (C) Polymerization (D) Citric Acid Cycle
52. Soredia are found in _____.
 (A) Lichens (B) Club mosses (C) Hornworts (D) Liverworts
53. Which of the following is not true about the enzyme RuBisCO?
 (A) It is the most abundant protein in the leaves
 (B) Mn^{2+} ions are needed for its activity
 (C) It consists of two protein subunits
 (D) It is involved in the first major step of carbon fixation

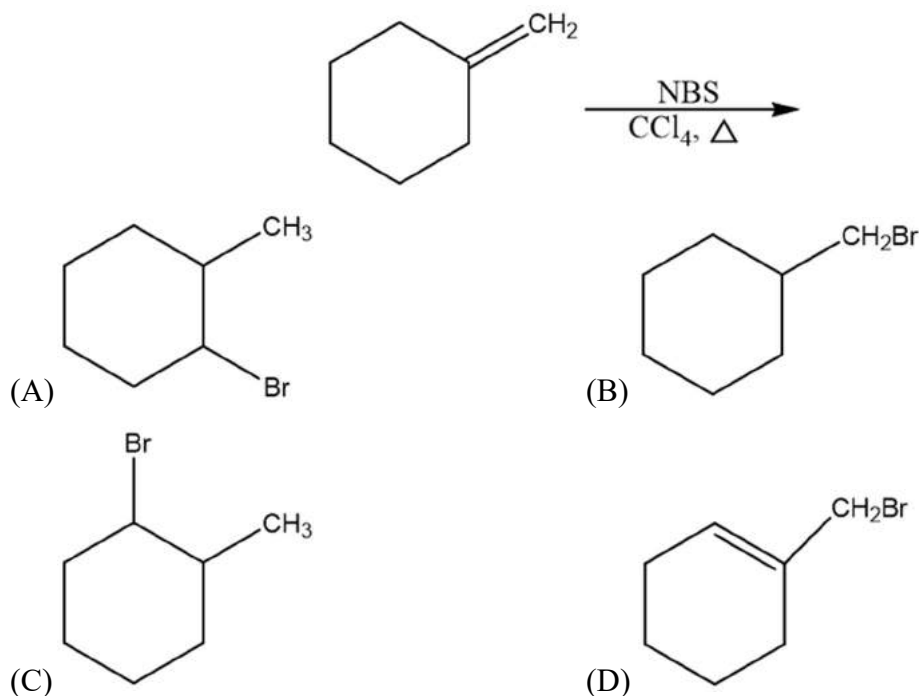
54. Who among the following proposed Monoclimax theory?
 (A) Egler (B) Whittaker (C) Tansley (D) Clements
55. Which of the following bacteria converts nitrite into nitrate?
 (A) *Pseudomonas* (B) *Nitrosomonas* (C) *Thiobacillus* (D) *Nitrobacter*
56. Which of the following is untrue about Pseudouridine?
 (A) Is an isomer of Uridine
 (B) Uracil is attached by N-C glycosidic bond
 (C) Uracil is attached via a C-C glycosidic bond
 (D) Is ubiquitous in tRNA
57. Which of the following is not a nonsense codon?
 (A) UAG (B) UAA (C) UGA (D) UCA
58. Which of the following RNA is involved in post transcriptional regulation of gene expression?
 (A) MicroRNA (B) Messenger RNA
 (C) Small interfering RNA (D) Small nucleolar RNA
59. Which of the following is not an *ex situ* method of conservation?
 (A) Biosphere reserve (B) Tissue culture
 (C) Seed bank (D) Botanical garden
60. Cryptochrome, a plant photoreceptor, was first identified in which of the following plants?
 (A) *Zea mays* (B) *Allium cepa*
 (C) *Arabidopsis thaliana* (D) *Nicotiana tabacum*
61. Who among the following proposed the Tunica - Corpus theory of apical meristems?
 (A) Guttenberg (B) Hanstein (C) Schmidt (D) Esau
62. A type of aneuploidy where a pair of homologous chromosomes is lost is known as_____
 (A) Monosomy (B) Nullisomy
 (C) Double monosomy (D) Tetrasomy
63. How many cofactors compose Photosystem I?
 (A) 80 (B) 100 (C) 90 (D) > 110
64. Which of the following is not true about *Arabidopsis thaliana*?
 (A) Belongs to family Brassicaceae
 (B) First plant whose genome was sequenced
 (C) Flowering plant with smallest genome
 (D) Is a model organism in plant biology
65. Who among the following coined the term Phytohormone?
 (A) Edouard Demole (B) Eiichi Kurosawa
 (C) Went and Thimann (D) Addicott and Davis

66. How many enzyme-catalyzed reactions are involved in glycolysis?
 (A) 9 (B) 10 (C) 11 (D) 12
67. In the eukaryotic cells, TCA cycle occurs _____.
 (A) In the matrix of mitochondrion
 (B) Along outer membrane of mitochondrion
 (C) In the inter-membrane space of mitochondrion
 (D) Along plasma membrane
68. Which of the following is the source of foreign gene in Bt cotton?
 (A) Bacterium (B) Virus (C) Mycoplasma (D) Fungus
69. Which of the following is untrue about the Ribulose 1,5-Bisphosphate (RuBP)
 (A) It is involved in photosynthesis
 (B) It is the primary carbon dioxide acceptor in plants
 (C) It is found only in Plants
 (D) It was discovered by Andrew Benson
70. Which of the following plants is not a root parasite?
 (A) *Orobanche* (B) *Striga* (C) *Viscum* (D) *Rafflesia*
71. Which of the following enzymes regulates the supercoiling of DNA molecule?
 (A) Topoisomerase (B) Helicase (C) Ligase (D) DNA Primase
72. Which of the following viroids was the first to be identified?
 (A) Eggplant Latent Viroid (B) Potato Spindle Tuber Viroid
 (C) Peach Latent Mosaic Viroid (D) Avocado Sunblotch Viroid
73. Which of the following interactions among species is least likely to affect population size?
 (A) Competition (B) Commensalism (C) Predation (D) Parasitism
74. Reserpine isolated from the roots of *Rauwolfia serpentina* is a type of _____.
 (A) Alkaloid (B) Oleoresin (C) Tannin (D) Terpene
75. Which of the following refers to the lower cold water zone of the lakes?
 (A) Bathyal (B) Hadal (C) Abyssal (D) Hypolimnion

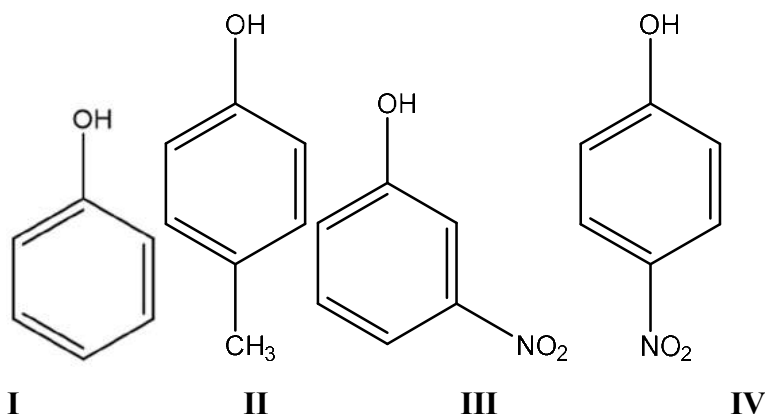
X-X-X

MSc(HS/2Yr)(Chemistry)

1. The major product formed in the reaction



2. In the following compounds, the order of acidic strength is



- (A) III>IV>I>II (B) I>IV>III>II (C) II>I>III>IV (D) IV>III>I>II

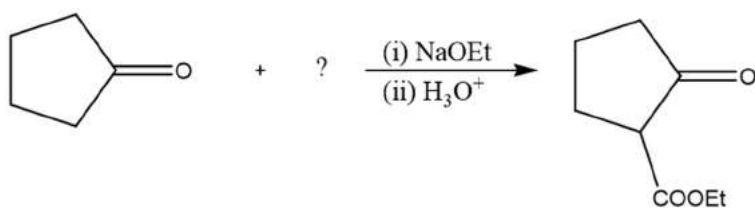
3. The conversion of alcohols into chloro compounds by reaction with SOCl_2 , follows the order

- (A) $1^\circ > 2^\circ > 3^\circ$ (B) $3^\circ > 2^\circ > 1^\circ$ (C) $2^\circ > 1^\circ > 3^\circ$ (D) $1^\circ = 2^\circ > 3^\circ$

4. Formic acid has C-O bond length $1.36 \text{ \AA}$ and C=O bond length $1.23 \text{ \AA}$; but in sodium formate these bond lengths are

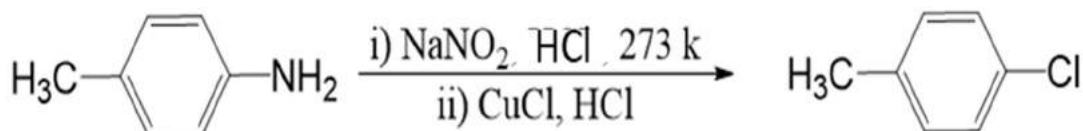
- (A) Both C-O and C=O becomes equal (B) Both the bond lengths are decreased
(C) Both the bond lengths are increased (D) Same as in formic acid

5. Identify the missing reagent in the reaction given below



- (A) Ethyl formate, HCOOEt (B) Diethyl oxalate, $\text{EtO}_2\text{CO}_2\text{Et}$
 (C) Diethyl carbonate, $(\text{EtO})_2\text{C=O}$ (D) Ethyl acetate, CH_3COOEt

6. Consider the following reactions



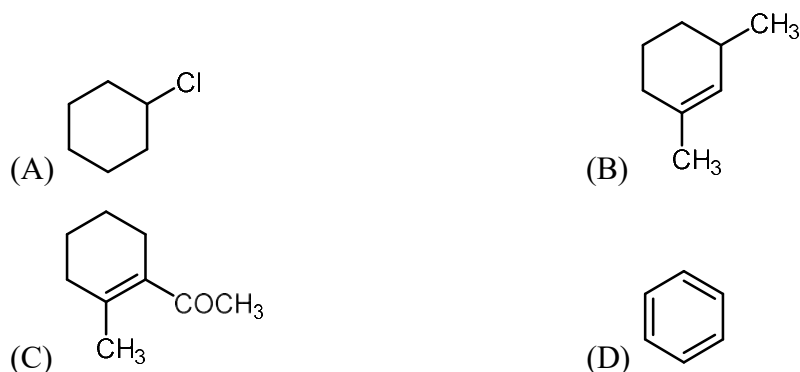
The name of the reaction and intermediate via which it is known to proceed are respectively

- (A) Hunsdiecker and benzyne (B) Sandmeyer and a free radical
 (C) Meerwein and a free radical (D) Sandmeyer and a carbanion

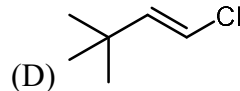
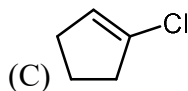
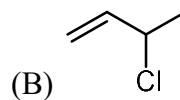
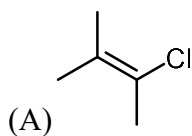
7. Which of the following is the strongest base?



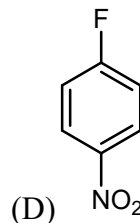
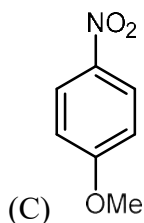
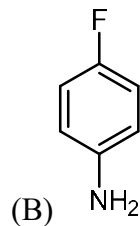
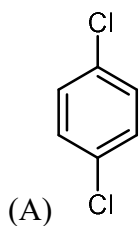
8. In which of the following molecules, all the effects namely inductive, mesomeric and hyperconjugation operate?



9. Which compound will be most easily eliminated to give an alkyne



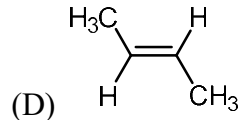
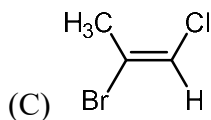
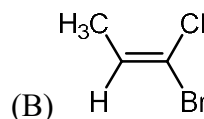
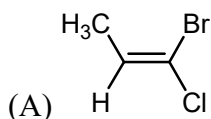
10. Which molecule will react with NaOH with fastest rate?



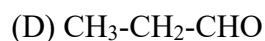
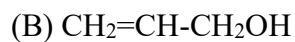
11. The reaction $\text{R}-\text{C}(=\text{O})\text{N}_3 \xrightarrow[\text{H}_2\text{O}]{\Delta} \text{R}-\text{NH}_2$ is an example of

(A) Hofmann rearrangement (B) Lossen rearrangement
(C) Curtius rearrangement (D) Cope rearrangement

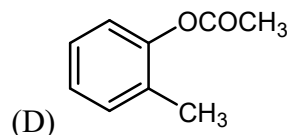
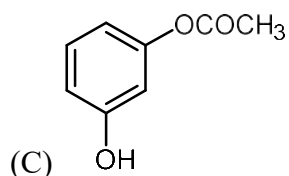
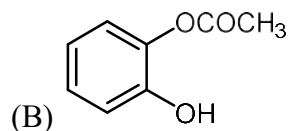
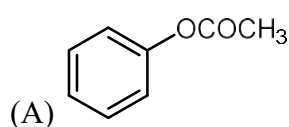
12. Which of the following is an Z-isomer?



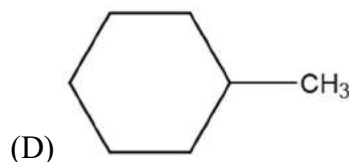
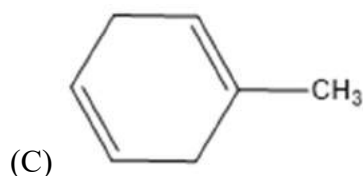
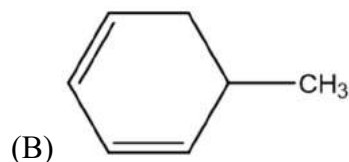
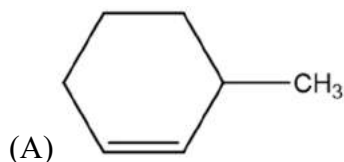
13. When $\text{CH}_2=\text{CH}-\text{COOH}$ is reduced with LiAlH_4 the compound obtained will be?



14. Among the following esters, the one that undergoes acid hydrolysis fastest is?



15. The Birch reduction of toluene gives



16. Which one of the following is not the use of quinoline?

- (A) It acts as a high boiling solvent
- (B) It acts as an antiseptic
- (C) In analytical work for precipitation of certain metals
- (D) In denaturing alcohol

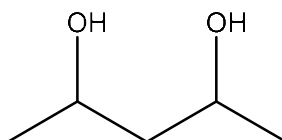
17. Which of the following compounds will not react with alcoholic KCN?

- (A) Ethyl chloride
- (B) Acetyl chloride
- (C) Phenyl chloride
- (D) Benzaldehyde

18. Which of the following solvents have maximum eluting power?

- (A) Pyridine
- (B) Acetone
- (C) Chloroform
- (D) Methanol

19. What is the number of possible stereoisomers for the structure given below?



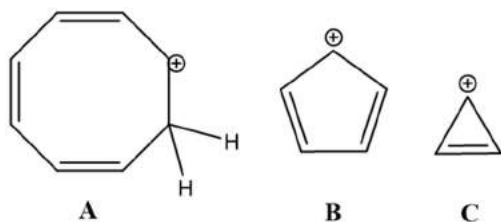
- (A) Two optically active and one meso
- (B) One optically active and one meso
- (C) Four optically active
- (D) Two optically active and two meso

20. Which of the following are isoelectronic species?

- | | |
|----------------------|---------------------|
| I. CH_3^+ | II. NH_2^- |
| III. NH_4^+ | IV. NH_3 |

- (A) I, II and III (B) II, III and IV (C) I, II and IV (D) I and II

21. Among the carbocations given below



- (A) A is homoaromatic, B is antiaromatic and C is aromatic
 (B) A is aromatic, B is antiaromatic and C is homoaromatic
 (C) A is homoaromatic, B is aromatic and C is homoaromatic
 (D) A is homoaromatic, B is aromatic and C is antiaromatic
22. Number of signals in the $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of (R)-4-methylpentan-2-ol are
 (A) 3 (B) 4 (C) 5 (D) 6
23. The compound that exhibits sharp bands at 3300 and 2150 cm^{-1} in the IR spectrum is
 (A) 1-butyne (B) 2-butyne (C) butyronitrile (D) butylamine
24. Which of the following vitamin contains nitrogen?
 (A) Vitamin A (B) Vitamin B (C) Vitamin C (D) Vitamin D
25. Formation of Grignard's reagent occurs through
 (A) S_{N} mechanism (B) S_{E} mechanism
 (C) Electron transfer mechanism (D) Addition mechanism
26. What will be the proportion of moles of metal (Cu:Ni:Ag) at cathode according to the second law of Faraday?
 (A) 1:2:1 (B) 1:2:2 (C) 2:2:1 (D) 1:1:2
27. In a refrigerator, the heat exhausted to the outer atmosphere is
 (A) Less than that absorbed from the contents of the refrigerator
 (B) More than that absorbed from the contents
 (C) Same as that absorbed from the contents
 (D) Any of the above depending upon the working substance
28. Vapour pressure of a liquid in a closed container depends upon
 (A) The volume of the container (B) The volume of the liquid
 (C) The temperature (D) Both (B) and (C)
29. Which one of the following gas reacts with hemoglobin blood and produce toxic effect?
 (A) CO_2 (B) SO_2 (C) NO_2 (D) CO

30. The work done during the free expansion of one mole of an ideal gas at 27°C to twice its original volume is
 (A) -1746 Jmol^{-1} (B) Zero (C) 1746 Jmol^{-1} (D) 748.2 Jmol^{-1}
31. In a chemical reaction $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$, xenon gas is added at constant volume. The equilibrium
 (A) Will shift towards the reactant
 (B) Will shift towards the products
 (C) Will not change the amount of reactant and products
 (D) Will increase both reactants and products
32. The spectroscopic technique that can distinguish unambiguously between trans-1,2-dichloroethylene and cis-1,2-dichloroethylene without any numerical calculation is
 (A) Microwave spectroscopy (B) UV-Visible spectroscopy
 (C) X-ray photoelectron spectroscopy (D) γ -ray spectroscopy
33. Inter system crossing is a radiation less transition:
 (A) between states of same multiplicity (B) between states of different multiplicity
 (C) between states of different energy (D) between states of same energy
34. In wurtzite structure, Zn^{2+} ions occupy
 (A) all tetrahedral sites (B) half tetrahedral sites
 (C) all octahedral sites (D) half octahedral sites
35. The number of radial nodes in 3s and 2p respectively are
 (A) 2 and 0 (B) 1 and 2 (C) 0 and 2 (D) 2 and 1
36. At relatively high pressure, van der Waals equation reduces to
 (A) $pV = RT + pb$ (B) $pV = RT - a/V^2$ (C) $pV = RT$ (D) $pV = RT - a/V$
37. The mixtures corresponding to either a minimum or maximum in boiling point curves are called
 (A) Eutectic mixtures (B) Azeotropic mixtures
 (C) Consolute mixtures (D) Ideal mixture
38. In the following which one is a natural colloid
 (A) Sodium chloride solution (B) Cane sugar solution
 (C) Urea solution (D) Blood
39. Gold number of protective colloids A, B, C and D are 0.50, 0.01, 0.1 and 0.005, respectively. The correct order of their protective power is
 (A) $D < A < C < B$ (B) $C < B < D < A$ (C) $A < C < B < D$ (D) $B < D < A < C$

40. For the equilibrium, $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$, which of the following will affect the equilibrium constant?
- (A) Promoter (B) Pressure change
(C) Temperature change (D) Catalyst
41. Generally, the one used in salt bridge is
- (A) NaCl (B) KCl (C) LiCl (D) HCl
42. Quantum dot nanocrystal (QDNS) measures between
- (A) 2-10 nm (B) 5-12 nm (C) 2-5 nm (D) 1-20 nm
43. For one mole of a gas, the total kinetic energy is equal to
- (A) RT (B) $\frac{3}{2} RT$ (C) $\frac{2}{3} K_b T$ (D) $(C_p - C_v)$
44. The rate of reaction becomes 2 times for every 10°C rise in temperature. How the rate of reaction will increase when temperature is increased from 30°C to 80°C .
- (A) 16 (B) 32 (C) 64 (D) 128
45. Which of the following is incorrect about catalyst?
- (A) It is required in very small concentrations
(B) It does not affect the position of equilibrium
(C) It initiates the reaction which otherwise cannot take place
(D) It is specific in its action
46. A process is carried out at constant volume and at constant entropy. It will be spontaneous if
- (A) $\Delta G < 0$ (B) $\Delta H < 0$ (C) $\Delta U < 0$ (D) $\Delta A < 0$
47. Which of the following is a lyophobic solution?
- (A) cellulose (B) starch (C) gelatin (D) gold sol
48. The osmotic pressure of the solution can be increased by:
- (A) increasing the number of solute
(B) increasing the volume
(C) removing the semipermeable membrane
(D) decreasing the temperature
49. When the concentrations of both the reactants and products are unity, the electrode potential is known as
- (A) standard electrode potential (B) ionisation potential
(C) redox potential (D) None of these
50. The incorrectly matched pair is:
- (A) STM – Scanning Tunneling Microscope
(B) AFM- Atomic Force Microscope

- (C) OAM-One Angstrom Microscope
(D) MEM-Macro Electro Mechanical System

51. Which pair is different from the others?

- (A) Li-Mg (B) B-Si (C) Be-Al (D) Li-Na

52. Identify the crystal system having axial characteristics $a = b \neq c$, $\alpha = \beta = \gamma = 90^\circ$

- (A) Monoclinic (B) Orthorhombic (C) Tetragonal (D) Triclinic

53. The Molecular orbital theory:

- (A) underestimates the importance of covalent structures
(B) overestimates the importance of ionic structures
(C) puts equal importance on both ionic and covalent structures
(D) is silent about ionic structure

54. The pair of gaseous molecules/ions having tetrahedral structure is

- (A) SnCl_4 , PH_4^+ (B) SeCl_4 , XeF_4 (C) ICl_4^- , PH_4^+ (D) SnCl_4 , ICl_4^-

55. SiH_4 , is an example of which of the following type of hydrides?

- (A) Ionic (B) Metallic (C) Interstitial (D) Covalent

56. XeF_6 on hydrolysis gives

- (A) XeO_3 (B) XeO_2 (C) XeO (D) Xe

57. The true statement for N_3^- is

- (A) It has non-linear structure
(B) It is called pseudo halogen
(C) The formal oxidation state of nitrogen in this anion is +1
(D) It is isoelectronic with N_2O

58. The coordination number of Ce in $[\text{Ce}(\text{NO}_3)_6]^{2-}$ is :

- (A) 6 (B) 8 (C) 12 (D) 4

59. The element between Pu and Cm is

- (A) Am (B) Np (C) U (D) Pa

60. The complexes $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ and $[\text{Co}(\text{NH}_3)_5\text{ONO}]\text{Cl}_2$, are examples of

- (A) Linkage isomers (B) Ionisation isomers
(C) Geometrical isomers (D) Coordination isomers

61. The zero magnetic moment of octahedral K_2NiFe_6 is due to

- (A) low spin d^6 Ni (IV) complex (B) low spin d^8 Ni (II) complex
(C) high spin d^8 Ni (+2) complex (D) high spin d^6 Ni (+4) complex

62. During biological N_2 fixation, for reduction of N_2 to $2NH_3 + H_2$, the number of ATP molecules required per N_2 reduced is
 (A) 8 ATP (B) 12 ATP (C) 16 ATP (D) 32 ATP
63. The brown, hazy fumes of photochemical smog are due to
 (A) nitrogen dioxide (B) aldehydes (C) SO_2 (D) CO_2
64. Which of the following electronic configurations corresponds to elements with largest electron affinity?
 (A) $1s^2 2s^2 2p^5$ (B) $1s^2 2s^2 2p^6$ (C) $1s^2 2s^2 2p^6 3s^2 3p^5$ (D) $1s^2 2s^2 2p^6 2s^1$
65. The orbital with two radial and two angular nodes is
 (A) 3p (B) 5d (C) 5f (D) 8d
66. The hybrid orbital of the central atom in AlF_4^- is
 (A) sp (B) sp^2 (C) sp^3 (D) sp^4
67. Metal having maximum oxidizing power is
 (A) Li (B) Ba (C) Cu (D) K
68. In which of the following complex ion, the central metal ion is in a state of $sp^3 d^2$ hybridization?
 (A) $[CoF_6]^{3-}$ (B) $[Fe(CN)_6]^{3-}$ (C) $[Co(NH_3)_6]^{3+}$ (D) $[Cr(NH_3)_6]^{3+}$
69. An element has the electronic configuration $1s^2, 2s^1$. Its oxide will be
 (A) Acidic (B) Basic (C) Neutral (D) Amphoteric
70. Which one plays a major role in the formation of complex compound?
 (A) Transition metal (B) Lanthanides and actinides
 (C) Representative elements (D) p-block elements
71. The nature of active methylene group is
 (A) Basic (B) Acidic (C) Amphoteric (D) Neutral
72. The correct order of stability of the following superoxides is
 (A) $KO_2 > RbO_2 > CsO_2$ (B) $RbO_2 > CsO_2 > KO_2$
 (C) $CsO_2 > RbO_2 > KO_2$ (D) $KO_2 > CsO_2 > RbO_2$
73. The pair of species having identical shapes for molecules of both species is
 (A) CF_4, SF_4 (B) XeF_2, CO_2 (C) BF_3, PCl_3 (D) PF_5, IF_5
74. Oxidation state for oxygen in O_2PtF_6 is
 (A) 0 (B) +1 (C) +1/2 (D) -1/2
75. The correct order of bond angle (smallest first) in H_2S, NH_3, BF_3 and SiH_4 is
 (A) $H_2S < SiH_4 < NH_3 < BF_3$ (B) $NH_3 < H_2S < SiH_4 < BF_3$
 (C) $H_2S < NH_3 < SiH_4 < BF_3$ (D) $H_2S < NH_3 < BF_3 < SiH_4$

MSc(HS/2Yr)(Zoology)

- 1) **Muscarinic acetylcholine receptors are type of**
(A) Ligand gated ion channels (B) G protein coupled receptors
(C) Voltage gated ion channels (D) Non gated ion channels
- 2) **Actinin protein present in sarcomere is**
(A) Required for attachment of actin filaments to the M-line
(B) Required for attachment of actin filaments to the Z-line
(C) Required for attachment of actin filaments with myosin filaments
(D) Required in H-zone for pulling actin filaments
- 3) **Insulin is a**
(A) Steroid hormone (B) Amino acid derived hormone
(C) Peptide hormone (D) Monoamine hormone
- 4) **Which treatment would provide the greatest therapeutic benefit in patients with acromegaly?**
(A) Glucocorticoid (B) Somatostatin
(C) Growth hormone (D) Thyroid hormone
- 5) **Conn's syndrome is caused by**
(A) Excessive production of angiotensinogen
(B) Low production of angiotensinogen
(C) Excessive production of aldosterone
(D) Low production of aldosterone
- 6) **Which of the following microtubule motor protein present in axoneme helps in the motility of cilia and flagella?**
(A) Myosin (B) Kinesin (C) Nexin (D) Dynein
- 7) **Nuclear lamins are**
(A) Type VI intermediate filaments (B) Type V intermediate filaments
(C) Type IV intermediate filaments (D) Type III intermediate filaments

- 8) In a population, W_{11} , W_{12} and W_{22} represents fitnesses of three genotypes A_1A_1 , A_1A_2 and A_2A_2 , respectively. If fitness relation between three fitnesses is $W_{11} > W_{12} < W_{22}$, what type of natural selection will it be
- (A) Underdominance
(B) Overdominance
(C) Directional selection against alleles A_1 and A_2
(D) Kin selection
- 9) Cystic fibrosis is a disease caused by recessive homozygous condition. Considering a population in Hardy-Weinberg equilibrium, if frequency of cystic fibrosis is 1 in 2000 individuals, then what percentage of individuals in that population will be heterozygous carriers?
- (A) 2.0% (B) 3.9% (C) 5.0% (D) 9.8%
- 10) Mississippian and Pennsylvanian are subperiods of which of the following geologic period
- (A) Cambrian (B) Silurian (C) Devonian (D) Carboniferous
- 11) *Hyracotherium* is a fossil of:
- (A) Human (B) Elephant (C) Camel (D) Horse
- 12) Which of the following is an example of trace fossil?
- (A) Burrows formed by ancient animals
(B) Very small insect trapped in amber
(C) Baby woolly rhino discovered in Siberia
(D) Petrified wood
- 13) By which of the following process nitrous acid causes mutations?
- (A) Converts guanine to ethylguanine
(B) Converts adenine to thymine
(C) Converts cytosine to uracil
(D) Converts uracil to cytosine
- 14) Cause of Turner syndrome is
- (A) Trisomy of X chromosome in females
(B) Monosomy of X chromosome in females

- (C) Trisomy of X chromosome in males
- (D) Monosomy of X chromosome in males

15) Which of the following organisms are also known as “lamp shells?”

- (A) Molluscs
- (B) Echinoderms
- (C) Bryozoans
- (D) Brachiopods

16) Fructose transporter expressed on the apical border of enterocytes in the small intestine is

- (A) GLUT5
- (B) GLUT2
- (C) SGLT1
- (D) SGLT2

17) Which of the following hormone increases the secretion of pancreatic enzymes?

- (A) Gastrin
- (B) Cholecystokinin
- (C) Secretin
- (D) Insulin

18) “Immune complexes” mediated hypersensitivity is

- (A) Type I hypersensitivity
- (B) Type II hypersensitivity
- (C) Type III hypersensitivity
- (D) Type IV hypersensitivity

19) Pancreatic lipase is an example of

- (A) Oxidoreductases
- (B) Transferases
- (C) Hydrolases
- (D) Lyases

20) Gastric inhibitory polypeptide is secreted by

- (A) Stomach
- (B) Small intestine
- (C) Pancreas
- (D) Liver

21) Which of the following complement component act as opsonin for phagocytosis of pathogens?

- (A) C2b
- (B) C3b
- (C) C5a
- (D) C3a

22) Which of the following antibody activate the classical pathway of complement system?

- (A) IgA
- (B) IgE
- (C) IgG
- (D) IgD

23) Maternal antibodies provide which type of immunity to the fetus

- (A) Natural passive immunity
- (B) Artificial passive immunity
- (C) Natural active immunity
- (D) Artificial active immunity

24) Enzymes that differ in amino acid sequence but catalyze the same chemical reaction are known as

- (A) Abzymes
- (B) Ribozymes

- (C) Isozymes (D) Allosteric enzymes

25) Which of the following act as allosteric activator for aspartate transcarbamoylase?

- (A) Adenosine triphosphate (B) Cytidine triphosphate
(C) Guanosine triphosphate (D) Thymidine triphosphate

26) Michaelis constant (K_m) value is equal to the concentration of substrate at

- (A) $\frac{1}{2} V_{max}$ (B) $\frac{3}{4} V_{max}$ (C) V_{max} (D) $\frac{3}{5} V_{max}$

27) Which of the following is not a property of genetic code?

- (A) Genetic code is non-ambiguous and universal
(B) Genetic code is triplet
(C) Genetic code is overlapping
(D) Genetic code is degenerate

28) Which sequence is required in the prokaryotic mRNA for the attachment of small subunit of ribosome during translation?

- (A) Kozak sequence (B) Shine-Dalgarno sequence
(C) TATA box sequence (D) TTAGGG repeat sequence

29) The eels are characterized by

- (A) Pharyngeal teeth (B) Snake like body
(C) No scales on body (D) Scales on head

30) At the end of telophase, I and cytokinesis there are

- (A) 4 haploid cells (B) 2 haploid cells
(C) 1 haploid ovum and 3 polar bodies (D) 2 diploid cells

31) In mammalian cells, the DNA of the centromere is characteristic of

- (A) Facultative heterochromatin (B) Euchromatin
(C) Dispersed chromatin (D) Constitutive heterochromatin

32) Golgi complex plays a major role in

- (A) Protein synthesis
(B) Glycosylation of lipids and proteins
(C) Removal of sulfate from the carbohydrates moiety of glycolipids

(D) Formation of secondary lysosomes

33) Which of the following amino acids is the precursor for the thyroid hormones T3 and T4?

(A) Tryptophan (B) Lysine (C) Tyrosine (D) Histidine

34) The term diversity means

- (A) The number of species in an area
- (B) The number and abundance of species in an area
- (C) The abundance of a species in an area
- (D) The type of species in an area

35) Which one of the following acts as a precocious urinary bladder in which nitrogenous waste accumulates during the development of chick?

(A) Amnion (B) Allantois (C) Yolk sac (D) Egg shell

36) The water vascular system is a characteristic of

(A) *Sycon* (B) *Asterias*
(C) *Fasciola hepatica* (D) *Pila*

37) Which type of surface marker is present on every nucleated cell in the human body?

(A) B receptor (B) T receptor (C) MHC-I (D) MHC-II

38) The study of degenerative changes in ageing is called as

(A) Etiology (B) Teratology (C) Gerontology (D) Chronology

39) Water is not reabsorbed in which of the following part of loop of Henle

(A) DCT (B) PCT
(C) Descending limb (D) *Ascending limb*

40) Diagnostic stage of *Trichuris trichura* is

- (A) D-shaped eggs
- (B) Barrel shaped eggs with 2 polar plug
- (C) Eggs with rhabditiform larvae
- (D) Eggs with empty space between shell and contents

41) Which of the following is uncoupler of oxidative phosphorylation?

(A) Cyanide (B) Oligomycin

- (C) 2, 4 dinitrophenol (D) Retinol

42) Quadrate bone in reptiles evolve to form which bone in mammals

- (A) Malleus bone (B) Incus (C) Hyoid (D) Stapes

43) Type of centra in vertebrae of mammals

- (A) Procelous (B) Amphicoelous
(C) Acoelous (D) Heterocoelous

44) Type of Jaw suspension in snake, lizards and birds

- (A) Monimostylic (B) Streptostylic
(C) Methystylic (D) Craniostylic

45) Name the first transgenic fish approved as food for human consumption?

- (A) GloFish (B) Salmon
(C) Snow trout (D) Trout

46) Pattern of migration in which fresh water fish travels several thousand km starting from the rivers and reaching the spawning grounds in the sea.

- (A) Catadromous (B) Anadromous
(C) Amphidromous (D) Potamodromous

47) Female anglerfish has a glowing, natural lure on top of its head to draw its meal nearer. This "fishing rod" is

- (A) Light-producing photophores (B) Luminous symbiotic bacteria
(C) Glandular luminous tissue (D) Luminous ostracod prey

48) The only apes found in India

- (A) Orangutan (B) Hoolock gibbons
(C) Gorilla (D) Chimpanzee

49) Pneumotaxic centre is located in

- (A) pons (B) cerebrum
(C) medulla (D) cerebellum

50) Rasping organ known as Radula is found in

- (A) *Holothuria* (B) *Asterias*

- (C) *Euplectella* (D) *Pila*

51) Which vessel transports blood rich in oxygen and nutrients to the fetus?

- (A) Ductus arteriosus (B) Ductus venosus
(C) Umbilical vein (D) Umbilical artery

52) In which menstrual cycle phase does implantation occur?

- (A) Menses (B) Ovulation
(C) Secretory (D) Proliferative

53) The excretory organ of *Saccoglossus* is

- (A) Malpighian tubules (B) Proboscis gland
(C) Gills (D) Excretory pore

54) Which of the following is an example of metalloprotein?

- (A) Protamine (B) Transferrin (C) Histone (D) Collagen

55) Name the class of RNA which takes part in RNA Editing?

- (A) snRNA (B) tRNA (C) gRNA (D) siRNA

56) Which of the following is a gregarious pest?

- (A) *Locusta* (B) *Apis* (C) *Laccifer* (D) *Bombyx*

57) In mammal's hind limbs are absent in

- (A) Cetaceans (B) Rodents
(C) Marsupials (D) Chiropterans

58) The two final product in the β -oxidation of odd chain fatty acids are

- (A) Acetyl CoA and malonyl CoA (B) Acetyl CoA and acetyl CoA
(C) Acetyl CoA and propionyl CoA (D) Acetyl CoA and succinyl CoA

59) Nucleoside consist of

- (A) A nitrogenous base, a five-carbon sugar and a phosphate group
(B) Two nitrogenous bases
(C) A nitrogenous base and a five-carbon sugar

(D) A nitrogenous base, a five-carbon sugar and two phosphate groups

60) Name the process by which a malignant cell spread throughout normal cells?

- | | |
|--------------------|-----------------|
| (A) Transformation | (B) Metastasis |
| (C) Invasiveness | (D) Progression |

61) Apolipoprotein B is important for the absorption of

- | | |
|-----------------|-----------------|
| (A) Glucose | (B) Fatty acids |
| (C) Amino acids | (D) Fructose |

62) Which one of the following is a Cephalochordate?

- | | |
|--------------------------|--------------------------|
| (A) <i>Molgula</i> | (B) <i>Branchiostoma</i> |
| (C) <i>Balanoglossus</i> | (D) <i>Herdmania</i> |

63) River Blindness is caused by

- | | |
|------------------------------------|--------------------------------|
| (A) <i>Loa loa</i> | (B) <i>Mansonella perstans</i> |
| (C) <i>Mansonella streptocerca</i> | (D) <i>Onchocerca volvulus</i> |

64) The units of conductivity are

- | | | | |
|----------|---------|-----------------------------|---------|
| (A) mg/L | (B) Lux | (C) $\mu\text{S}/\text{cm}$ | (D) ppm |
|----------|---------|-----------------------------|---------|

65) Nebenkern' is the sheath on either side of axial filament in a spermatid is formed by

- | | | | |
|----------------|---------------|------------------|---------------|
| (A) Golgi body | (B) Centriole | (C) Mitochondria | (D) Nucleolus |
|----------------|---------------|------------------|---------------|

66) Which of the following is not a carp?

- | | |
|------------------------------------|---------------------------------------|
| (A) <i>Heteropneustes fossilis</i> | (B) <i>Schizothorax richardsonii</i> |
| (C) <i>Garra gotla gotyla</i> | (D) <i>Hypothalmichthyes molitrix</i> |

67) Which of the following represents the depolarization of the ventricles?

- | | |
|-----------------|-----------------|
| (A) P-wave | (B) T-wave |
| (C) QRS complex | (D) PQ interval |

68) The term "New Systematic" was introduced by:

- | | |
|-------------------|------------------|
| (A) Linnaeus | (B) Adolf Engler |
| (C) Julian Huxley | (D) Aristotle |

69) The ability of the cell or tissue to respond to a specific induction signal is known as

- | | |
|----------------|-----------------------|
| (A) Competence | (B) Equivalence group |
| (C) Response | (D) Potency |

70) C-value paradox suggests us about

- (A) collinearity between genome size and complexity of organism
- (B) non-Collinearity between genome size and complexity of organism
- (C) number of chromosomes
- (D) dosage compensation

71) Juxtaglomerular cells in the kidney secrete

- | | |
|-----------------|-----------------|
| (A) Renin | (B) Aldosterone |
| (C) Vasopressin | (D) Epinephrine |

72) Which of the following is not a measure of similarity index?

- | | |
|---------------------|---------------------------|
| (A) Shannon's Index | (B) Jaccard Index |
| (C) Sorensen index | (D) Morisita Horn measure |

73) Casoni's test is used for the diagnosis of

- | | |
|------------------|--------------------|
| (A) Taeniasis | (B) Hydatidiasis |
| (C) Trichuriasis | (D) Onchocerciasis |

74) Hydrochloric acid in stomach is secreted by

- | | |
|-----------------|---------------------------|
| (A) Chief cells | (B) Parietal cells |
| (C) Alpha cells | (D) Enteroendocrine cells |

75) *Ichthyophis* is

- | | |
|----------------|------------------|
| (A) An Annelid | (B) A Dinosaur |
| (C) A Snake | (D) An Amphibian |

x-x-x

MSc(HS)(Geology)

1. Which of the following processes does not occur during lithification?
(A) Recrystallization (B) Compaction (C) Cementation (D) Saltation
2. Sea waves cause the formation of
(A) Yardang (B) Cliff (C) Kettle (D) Ventifact
3. Which one of the following processes is responsible for the formation of “levee”?
(A) Aeolian (B) Fluvial (C) Coastal (D) Glacial
4. Which one of the following indicates correct order of magnetic chrons?
(A) Gauss – Bruhnes– Gilbert – Matuyama (B) Gilbert – Matuyama– Bruhnes –Gauss
(C) Gauss – Gilbert– Matuyama –Bruhnes (D) Gilbert – Gauss– Matuyama –Bruhnes
5. The formation of accretionary wedge is associated with
(A) Convergent plate boundary (B) Divergent plate boundary
(C) Transform fault (D) Passive margin
6. Which one of the following is a sulphate mineral?
(A) Fluorite (B) Talc (C) Allanite (D) Gypsum
7. Which one of the following statements is correct?
(A) The order of interference colours increases with increasing birefringence
(B) The order of interference colours decreases with increasing birefringence
(C) The order of interference colours decreases with increasing retardation
(D) The order of interference colours is independent of birefringence
8. Pericline twinning can be observed in
(A) Oligoclase (B) Orthoclase (C) Adularia (D) Microcline
9. The Si:O in case of six linked tetrahedra of Cyclosilicate is:
(A) 3:2 (B) 1:3 (C) 3:1 (D) 2:3
10. Which of the following minerals has two cleavage planes which are almost perpendicular to each other?
(A) Barite (B) Labradorite (C) Kyanite (D) Calcite
11. The process of unmixing of K-feldspar and Na-feldspar during cooling is known as
(A) Pseudomorphism (B) Polymorphism (C) Isomorphism (D) Exsolution
12. Which one of the following is not a high-field strength element?
(A) Ti (B) Zr (C) Nb (D) Ni
13. Which one of the following is a Siderophile element?
(A) Be (B) Sr (C) Pt (D) He
14. The elements which have different proton number but same neutron number are called

- (A) isotopes (B) isobars (C) neutrinos (D) isotones
15. Which one of the following radioactive isotope has the shortest half life?
 (A) ^{238}U (B) ^{232}Th (C) ^{87}Rb (D) ^{147}Sm
16. The position of element Eu is between
 (A) Nd and Sm (B) La and Gd (C) Sm and Gd (D) Sm and Tb
17. The HREE depletion pattern in a rock sample indicate presence of
 (A) Garnet in source residue (B) Plagioclase in source residue
 (C) Hornblende in source residue (D) Augite in source residue
18. Throw of the fault is the
 (A) Vertical component of the separation
 (B) Horizontal component of the separation
 (C) Angle between horizontal component and fault plane
 (D) Angle between vertical component and fault plane
19. Positive flower structure is associated with
 (A) Transpression (B) Transtension (C) Both A and B (D) Neither A nor B
20. The folds with folding angle equal to 180° are called
 (A) Fan folds (B) Open Folds (C) Tight folds (D) Isoclinal folds
21. When both the plunge and dip of axial plane are 60° , the fold is called
 (A) Reclined (B) Recumbent
 (C) Gently inclined and gently plunging (D) Steeply inclined and steeply plunging
22. Slickenside is an example of
 (A) Penetrative lineation (B) Penetrative S-tectonite
 (C) Penetrative foliation (D) Non-penetrative foliation
23. Which one of the following textures show worm-like blebs of quartz hosted in plagioclase?
 (A) Graphic (B) Myrmekite (C) Symplectite (D) Spinifex
24. The porphyritic-panidiomorphic texture is typical of
 (A) Kimberlite (B) Komatiite (C) Carbonatite (D) Lamprophyre
25. An per the IUGS classification, a coarse-grained igneous rock comprising olivine and orthopyroxene is
 (A) Troctolite (B) Norite (C) Harzburgite (D) Wehrlite
26. A basaltic melt is produced by
 (A) Anhydrous partial melting of lherzolite
 (B) Hydrous partial melting of lherzolite

- (C) Anhydrous partial melting of harzburgite
(D) Hydrous partial melting of harzburgite
27. Which one of the following pairs represents correct volcanic-plutonic equivalents?
(A) Trachyte-Nepheline syenite (B) Trachyte-Granodiorite
(C) Dacite-Granodiorite (D) Dacite- Syenite
28. Which one of the following mineral assemblages is characteristic of andesite?
(A) Plagioclase-Hornblende (B) Orthoclase-Hornblende
(C) Orthoclase-Biotite (D) Plagioclase-Augite
29. The inner part of the metamorphic contact aureole is characterised by
(A) Hornstone (B) Hornfels (C) Spotted slate (D) Spotted schist
30. Complete the reaction
Quartz + Muscovite = ... + Sillimanite + H₂O
by substituting the correct option from the following:
(A) Orthoclase (B) Andalusite (C) Garnet (D) Staurolite
31. Which one of the following types of metamorphism form spilite?
(A) Contact metamorphism (B) Burial metamorphism
(C) Ocean floor metamorphism (D) Dynamothermal metamorphism
32. Medium-grade metapelites are best to study deformation versus mineral growth because they
(A) Lack porphyroblasts and deform easily
(B) Lack porphyroblasts and difficult to deform
(C) Contain porphyroblasts and deform easily
(D) Contain porphyroblasts and difficult to deform
33. Planar fabric in schist can be best observed if a thin section is cut
(A) Perpendicular to the lineation (B) Perpendicular to the foliation
(C) Parallel to the lineation (D) Parallel to the foliation
34. Which one of the following is a typical product of brittle deformation?
(A) Mylonite (B) Protomylonite (C) Ultramylonite (D) Fault breccia
35. Greenschist facies mineral assemblage in metabasites is represented by
(A) Albite-muscovite-tremolite-epidote (B) Albite-chlorite-tremolite-epidote
(C) Albite-chlorite-actinolite-epidote (D) Albite-muscovite-actinolite-epidote
36. A rock metamorphosed during continent-continent collision is characterized by
(A) Gentle clockwise P-T-t path (B) Steep clockwise P-T-t path

- (C) Gentle anticlockwise P-T-t path (D) Steep anticlockwise P-T-t path
37. K is an essential structure constituent of
 (A) Kaolinite (B) Halloysite (C) Illite (D) Montmorillonite
38. Lithic arenite is characterized by
 (A) <15% matrix and >25% rock fragments; feldspars < rock fragments
 (B) <15% matrix and <25% rock fragments; feldspars > rock fragments
 (C) >15% matrix and >25% rock fragments; feldspars = rock fragments
 (D) >15% matrix and <25% rock fragments; feldspars < rock fragments
39. Which of the following is NOT used to delineate the top and bottom of the beds?
 (A) Asymmetrical ripple marks (B) Symmetrical ripple marks
 (C) Cross-bedding (D) Mud cracks
40. The grain-supported allochthonous limestone is known as
 (A) Floatstone (B) Flagstone (C) Packstone (D) Wackstone
41. A sediment grain-size population showing different mode, mean and median values is known as
 (A) Skewness (B) Kurtosis (C) Moment (D) Mode
42. Which one of the following habitats is suitable for *Mytilus*?
 (A) Bysally attached form (B) Free lying form
 (C) Burrowing variety (D) Boring variety
43. *Planorbis* belongs to the Phylum
 (A) Gastropoda (B) Pelecypoda (C) Brachiopoda (D) Cephalopoda
44. *Stegosaurus* is a
 (A) Dinosaur (B) Elephant (C) Horse (D) Turtle
45. The wall structure in *Fusulina* is
 (A) Microgranular (B) Agglutinated (C) Hyaline (D) Porcellaneous
46. Barakar Formation is characterised by plant fossil
 (A) *Ptilophyllum* (B) *Dicroidium* (C) *Noeggerathiopsis* (D) *Schizoneura*
47. Which one of the following stratigraphic boundaries is associated with extinction of Trilobites?
 (A) Cretaceous-Palaeogene (B) Cambrian-Ordovician
 (C) Ordovician-Silurian (D) Permian-Triassic
48. The rocks of Cuddapah Supergroup are characterized by alternate layers of
 (A) Limestone and sandstone (B) Limestone and quartzite
 (C) Shale and quartzite (D) Shale and sandstone

49. The correct stratigraphic order of the Upper Siwalik Group is
 (A) Tatrot-Pinjur-Boulder Bed Conglomerate
 (B) Boulder Bed Conglomerate-Pinjur-Tatrot
 (C) Kamlial-Chinji-Nagri
 (D) Nagri-Chinji-Kamlial
50. Which one of the following period is known for extensive glaciation in Peninsular India?
 (A) Pliocene-Pleistocene (B) Miocene-Pliocene
 (C) Triassic-Jurassic (D) Permo-Carboniferous
51. The rocks of Umia Formation are best exposed in
 (A) Central India (B) South India (C) Rajasthan (D) Kachchh
52. Kaimur, Rewa and Bhandar belong to
 (A) Lower Cuddapahs (B) Upper Cuddapahs
 (C) Lower Vindhya (D) Upper Vindhya
53. The Zawar Pb-Zn deposits occur in
 (A) Amphibolite (B) Dolomite (C) Schist (D) Greywacke
54. The Indian manganese deposits are associated with
 (A) Nallamali Group (B) Neyveli Group (C) Mansar Formation (D) Maton Formation
55. Porphyry copper deposits dominantly result from
 (A) Magmatic water (B) Meteoric water
 (C) Residual concentration (D) Placer concentration
56. Mullite-bearing refractories are calcined product of
 (A) Corundum (B) Gypsum (C) Talc (D) Sillimanite
57. Which one of the following economic deposits occurs in Mangampeta?
 (A) Barite (B) Bentonite (C) Feldspar (D) Fluorspar
58. Which one of the following is an ore mineral of copper?
 (A) Bornite (B) Braunite (C) Hemimorphite (D) Hausmannite
59. What is the age of hydrocarbon source rock in the Cambay basin?
 (A) Triassic (B) Jurassic (C) Cretaceous (D) Eocene
60. Which one of the following Gondwana formations is a major storehouse of coal?
 (A) Barren Measure (B) Barakar (C) Panchet (D) Mahadeva
61. Which one of the following ore deposits is commonly hosted by carbonatites?

- (A) Zn-Pb (B) Ni (C) Cu (D) Rare earth elements
62. Which one of the following ore deposits result from early magmatic segregation?
 (A) Chromite (B) Bauxite (C) Iron (D) Manganese
63. Which one of the following statements is correct?
 (A) Earthen dam resists external forces by its own weight
 (B) Arch dam resists external forces by its own weight
 (C) Gravity dam resists external forces by its own weight
 (D) Buttress dam resists external forces by its own weight
64. A reservoir in a dam will be stable
 (A) When beds are dipping downstream (B) When beds are dipping upstream
 (C) In flood plain areas (D) Near fault zone
65. Which one of the following sites is suitable for construction of tunnel?
 (A) Syncline (B) Anticline (C) Vertical beds (D) Fractured limestone
66. The transmissivity of an aquifer is measured in
 (A) cm^3/day (B) cm/day (C) m/day (D) m^2/day
67. Which one of the following rocks has high specific retention?
 (A) Sandstone (B) Shale (C) Conglomerate (D) Granite
68. A water sample with concentration of CaCO_3 at 120-180 mg/L is considered as
 (A) Soft water (B) Moderately hard water
 (C) Hard water (D) Very hard water
69. A porous unconsolidated sandstone is known as
 (A) Aquifer (B) Aquifuge (C) Aquiclude (D) Aquitard
70. Which one of the following is the correct relationship between Young's modulus 'E' and the Lamé's parameter ' λ ' for a Poisson solid?
 (A) $E = \lambda$ (B) $E = 1.5\lambda$ (C) $E = 2.5\lambda$ (D) $E = 3.5\lambda$
71. The maximum depth of penetration can be achieved by
 (A) Natural alpha-ray log (B) Natural gamma-ray log
 (C) Natural density log (D) Density log
72. Shear waves do not travel through
 (A) Upper crust (B) Lower crust (C) Outer core (D) Inner core
73. Which one of the following surveys is considered most suitable for the exploration of groundwater?
 (A) Gravity (B) Magnetic (C) Seismic (D) Electrical
74. The orbital radius of global positioning satellite is equal to

(A) 13,600 km (B) 18,600 km (C) 26,600 km (D) 36,600 km

75. How many minimum satellites are required to get correct location from GPS?

(A) 1 (B) 2 (C) 3 (D) 4

x-x-x

Master in Geo-informatics

1. The current President of India is:
(A) Smt. Droupadi Murmu
(B) Shri Ram Nath Kovind
(C) Shri Pranab Mukherjee
(D) Smt. Prathibha Devisingh Patil
2. The term WWW in computer networks mean:
(A) World Whole Web
(B) Wide Web World
(C) Wild Whole Web
(D) World Wide Web
3. Which of the following is *not a social media and networking site*?
(A) Facebook
(B) Microsoft Word
(C) Twitter
(D) Instagram
4. Which one of the following is most critical reason for global warming?
(A) Erosion of soil
(B) Contamination of water resources
(C) Excessive use of fossil fuels
(D) Depletion of natural wetlands
5. Who coined the term '*Remote Sensing*'?
(A) George Walsh
(B) Evelyn Pruitt
(C) John Smith
(D) David Ricardo
6. The Indian Space Research Organisation (ISRO) was established in:
(A) 1999 (B) 1949 (C) 1969 (D) 2009
7. Which Indian state was the first to legislate an Act to provide legal and regulatory framework for disaster management in 2003?
(A) Sikkim (B) Gujarat (C) Odisha (D) Bihar
8. Human eye can detect _____ spectrum of electromagnetic radiation.
(A) Only Visible energy
(B) UV and Visible energy
(C) Visible and Infrared energy
(D) Only microwaves
9. The term 'Biome' denotes:
(A) A group of mammals

- (B) Amphibians
- (C) Reptiles
- (D) A group of ecosystems

10. Chipko Movement for the conservation of trees was started in:

- (A) Uttarakhand, 1973
- (B) Rajasthan, 1974
- (C) Madhya Pradesh, 1965
- (D) Gujarat, 1966

11. The two basic components of an Ecosystems are:

- (A) Bacterial and Fungi
- (B) Trees and water
- (C) Plants and humans
- (D) Abiotic and biotic

12. In India, Cheetah was recently reintroduced in _____.

- (A) Kuno National Park, Madhya Pradesh
- (B) Great Himalayan National Park, Himachal Pradesh
- (C) Ranthambhore National Park, Rajasthan
- (D) Kaziranga National Park, Assam

13. GNSS refers to:

- (A) Global Network Spatial System
- (B) Global Navigation Satellite System
- (C) Geographical Network Satellite System
- (D) Geographical News Service System

14. Which of the river flows through the Indian Punjab?

- (A) Jhelum (B) Satluj (C) Chenab (D) Kosi

15. The 'Spatial database' is also known as:

- (A) Numerical databases
- (B) Binary databases
- (C) Attribute database
- (D) Geodatabase

16. Which of the following is an Indian geostationary orbiting Communication Satellite?

- (A) Galileo (B) GEO-EYE (C) INSAT 4D (D) SPOT

17. The Kangra earthquake of 1905 had magnitude of _____.

- (A) 7.8 M_s (B) 6.5 M_s (C) 9.6 M_s (D) 5.8 M_s

18. Asiatic Lion is associated with?

- (A) Gir National Park
- (B) Simlipal National Park
- (C) Annamalai Hills

(D) Sundarbans

19. Nitrogen constitutes _____ percent of earth's atmosphere:
(A) 78 (B) 23 (C) 33 (D) 88
20. Which of the following is lower most layer of earth's atmosphere:
(A) Ionosphere
(B) Exosphere
(C) Stratosphere
(D) Troposphere
21. LANDSAT is a satellite series of:
(A) Australia (B) France (C) USA (D) Russia
22. Harike wetland is situated in the state of _____.
(A) Punjab (B) Maharashtra (C) Kerala (D) Telangana
23. Which of the following is an Indian satellite
(A) LANDSAT
(B) IKONOS
(C) QUICKBIRD
(D) IRS-ID
24. Which of the following India is a biodiversity hotspot in India?
(A) Gulf of Cambay
(B) The Western Ghats
(C) The Siwalik Hills
(D) Garo Hills
25. Mangroves are characteristic feature of _____.
(A) Sundarbans
(B) The Western Himalayas
(C) Sahyadri Range
(D) Chota Nagpur Plateau
26. Sink hole feature is associated with:
(A) Glacial Landforms
(B) Desert Landforms
(C) Lacustrine Landforms
(D) Karst Landforms
27. When electromagnetic radiation enters earth's atmosphere, it undergoes:
(A) Scattering
(B) Absorption
(C) Transmission
(D) All of the above

28. The terms 'Savanna' represents:
 (A) Polar Tundra Vegetation
 (B) Boreal Forests
 (C) Tropical Grasslands
 (D) Hot deserts
29. _____ was the summer capital of the British Empire in India.
 (A) Port Blair (B) Shimla (C) Kolkatta (D) Darjeeling
30. Indian Institute of Remote Sensing (IIRS) is located in _____.
 (A) Varanasi (B) Bhopal (C) Mumbai (D) Dehradun
31. Govind Sagar Reservoir of Bhakra-Nangal Dam is built on the river:
 (A) Satluj (B) Ganga (C) Indus (D) Godavari
32. The largest desert in the world is _____.
 (A) Thar Desert
 (B) Victoria Desert
 (C) Gobi Desert
 (D) Sahara Desert
33. The '*primary producer*' in a natural ecosystem comprises of _____.
 (A) Plants (B) Insects (C) Birds (D) Humans
34. The art and science of map making is called _____.
 (A) Cinematography
 (B) Photography
 (C) Choreography
 (D) Cartography
35. GLONASS is a satellite navigation system developed by _____.
 (A) United Kingdom
 (B) China
 (C) Russia
 (D) Iran
36. Which atmospheric gas screens out the UV radiation from the sun?
 (A) Helium (B) Hydrogen (C) Carbon (D) Ozone
37. 'GAIA' Hypothesis was propounded by _____.
 (A) Alexander von Humboldt
 (B) James Lovelock
 (C) Anaximander
 (D) Ptolemy
38. Which remote sensing sensors detect temperature/heat signature of objects:

- (A) Thermal Infrared Sensor
- (B) Microwave Sensor
- (C) UV sensors
- (D) Sonar

39. _____ is a non-renewable resource of energy:

- (A) Water
- (B) Tree
- (C) Coal
- (D) Wind

40. _____ is the scientific study of earthquakes:

- (A) Geomorphology
- (B) Sedimentology
- (C) Glaciology
- (D) Seismology

41. Which of the following is an example of a natural hazard?

- (A) Chemical explosion
- (B) Tropical Cyclone
- (C) Nuclear Accident
- (D) Famine

42. The relationship between earthquake magnitude and damage potential may be best described as:

- (A) Increases in magnitude leads to decrease in damage potential
- (B) No change in damage potential
- (C) Increases in magnitude leads to increase in damage potential
- (D) None of the above

43. Organic farming includes:

- (A) Use of synthetic pesticides
- (B) No use of chemical fertilizers
- (C) Use of synthetic insecticides
- (D) Use of synthetic chemicals

44. Microwave Remote Sensing uses _____

- (A) UV energy waves
- (B) Near Infrared waves
- (C) Sound waves
- (D) Long waves ranging from 1m-1mm

45. Sound waves are used in _____

- (A) Microwaves
- (B) Sonar technology
- (C) Thermal scanners
- (D) Wind turbines

46. _____ river is called 'the sorrow of China'.
 (A) Hwang Ho (B) Nile (C) Tigris (D) Amu
47. The term GIS refers to?
 (A) Genetic Information System
 (B) Global Intelligence System
 (C) Geographical Information System
 (D) General Intelligent System
48. The Monsoon reaches the Indian mainland during:
 (A) Last week of March- First week of April
 (B) Late December-Early January
 (C) Last week of May- First week of June
 (D) Late October- early November
49. _____ is the Capital of Punjab and Haryana States.
 (A) Karnal (B) Patiala (C) Panchkula (D) Chandigarh
50. Which of the Indian State does not share boundary with Myanmar?
 (A) Bihar (B) Mizoram (C) Manipur (D) Nagaland
51. IRNSS refers to
 (A) Indian Regional Navigation Satellite System
 (B) Ireland Remote National Satellite System
 (C) International Remote Navigation Satellite System
 (D) Indian Remote National Satellite System
52. The famous tower Burj Khalifa is located in:
 (A) Muscat, Oman
 (B) Doha, Qatar
 (C) Dubai, UAE
 (D) Riyadh, Saudi Arabia
53. _____ is older than the Himalayas:
 (A) River Beas (B) River Ravi (C) River Chenab (D) River
 Sutlej
54. _____ is a geostationary satellite.
 (A) INSAT (B) IRS-P6 (C) IKONOS (D) LANDSAT
55. A Geographical Information System deals with _____.
 (A) Numerical data only
 (B) Binary data only
 (C) Attribute data only
 (D) Spatial and attribute data
56. The term 'Metadata' refers to:
 (A) Data about data

- (B) Oceanographic data
- (C) Elevation data
- (D) Mineral data

57. The name of the mission launched by Indian government to evacuate its citizens from Sudan in 2023 was:

- (A) Operation Vijay
- (B) Operation Kaveri
- (C) Operation Jai
- (D) Operation Karma

58. Which Indian sportsperson won the gold medal in 2021 Olympics?

- (A) PV Sindhu
- (B) Mirabai Chanu
- (C) Neeraj Chopra
- (D) Ravi Kumar Dahiya

59. Which of the following is not a Web Browser?

- (A) Google Chrome
- (B) Firefox
- (C) Internet Explorer
- (D) Kindle

60. 'Ambedkar Jayanti' to commemorate the memory of Dr B.R. Ambedkar is observed in India on:

- (A) January 14
- (B) February 14
- (C) March 14
- (D) April 14

61. The Outer Himalayas are also known as _____.

- (A) Pir-Panjal
- (B) Siwaliks
- (C) Dhauladhar
- (D) Zaskar Range

62. Which of the following is not a data collection technique?

- (A) Field Survey
- (B) Data Analysis and Tabulation
- (C) Interviews
- (D) Questionnaire and Schedules

63. What is smallest unit of the information in a computer system?

- (A) A bit
- (B) A byte
- (C) A block
- (D) A nibble

64. _____ is the extension of *PowerPoint* in the Microsoft windows?

- (A) .txt
- (B) .xls
- (C) .pptx
- (D) .bmp

65. Chilika Lake, a brackish water lagoon is situated in:

- (A) West Bengal
- (B) Kerala
- (C) Tamil Nadu
- (D) Odisha

66. The method of transferring the graticule of latitude and longitude on a plane surface

is called as:

- (A) Map Intersection
- (B) Map Projection
- (C) Map Interpolation
- (D) Map Creation

67. A compass bearing of 180 degrees describes _____.

- (A) North direction
- (B) East direction
- (C) West direction
- (D) South direction

68. The Radcliffe line marks the boundary between _____.

- (A) India and Myanmar
- (B) India and Bhutan
- (C) India and Nepal
- (D) India and Pakistan

69. 'Pedology' refers to the study of _____.

- (A) Soils
- (B) Rivers
- (C) Oceans
- (D) Atmosphere

70. The Atal Tunnel passes through

- (A) Shipki La Pass
- (B) Rohtang Pass
- (C) Bomdi La Pass
- (D) Nathu La Pass

71. The oldest mountains in India are:

- (A) Vindhyas
- (B) Siwaliks
- (C) Aravalli
- (D) Nilgiris

72. In a computer system the term RAM refers to _____.

- (A) Remote Action Memory
- (B) Random Access Memory
- (C) Regional Active Memory
- (D) Random Action Memory

73. The full form of HTTP is _____:

- (A) High Transfer Time Prototype
- (B) Hyper Text Transfer Protocol
- (C) Human Transfer Time Protocol
- (D) Higher Text Transfer Prototype

74. The _____ of radiation states that the *"Every object emits radiation at all times and at all wavelengths"*.

- (A) Planck's Law
- (B) Newton's 1st law

- (C) Newton's 2nd law
- (D) Stefan-Boltzmann Law

75. The term RADAR stands for:

- (A) Remote Device and Range
- (B) Radio Detecting and Ranging
- (C) Random Device and Range
- (D) Real Device and Range

-X-X-X-

M.A. (Economics)

1. Which of the following is true for Seasonal Unemployment?
(A) It is defined as people not being able to find jobs during some months of the year
(B) It is another name used for disguised unemployment
(C) It is primarily the feature of urban areas
(D) It is a part of educated unemployment
2. Who among the following gave the Theory of demographic Transition?
(A) David Ricardo
(B) Charls Darwin
(C) Thomas Robert Malthus
(D) Frank W. Notestein
3. MGNREGA 2005 is also referred to as
(A) Right to Live
(B) Right to Speak
(C) Right to work
(D) Right to equal remuneration
4. Economic development means
(A) Economic growth
(B) Improvement in the living standard of the urban population
(C) Economic growth plus structural and qualitative changes
(D) Sustainable increases in Gross National Product (GDP)
5. **Sustainable Development implies**
(A) Sustained rise in real GDP and per capita income
(B) Development that meets the need of the present generation without compromising the ability of the future generation to meet their own needs
(C) Full exploitation of resources to meet the need of the present generation only
(D) Sustained reduction in unemployment, poverty, and inequalities
6. The concept of low level equilibrium trap was given by
(A) R.R. Nelson
(B) Ragnar Nurkse
(C) Albert Hirschman
(D) Paul Patrick Streeten
7. Which of the following is not one of the three indivisibilities in the big push theory?
(A) Indivisibilities of supply of savings
(B) Indivisibilities in investment function
(C) Indivisibilities in production function
(D) Indivisibilities of demand
8. The planning is needed in under developed countries to
(A) promote market perfection and inequalities
(B) ensuring socially sub-optimal use of resources
(C) promote market imperfection
(D) ensuring socially sub-optimal use of resources
9. The annual number of live births per 1,000 people is called as?
(A) Total Fertility rate
(B) General Fertility rate
(C) Crude Birth rate
(D) Gross Reproduction rate
10. What is new about new HDI (2010)

- (A) Geometric mean used in place of arithmetic mean
 (B) Gross Domestic Product (GDP) is now excluded
 (C) Population of country also taken into consideration
 (D) Arithmetic mean used in place of Geometric mean
11. If \$3.60 is needed to purchase £2, the exchange rate is
 (A) £1=\$1 (B) \$1.80=£1 (C) £1.80=\$1 (D) \$1=£3.60
12. According to Heckscher-Ohlin theory, the most important cause of the difference in relative commodity prices and trade between nations is a difference in
 (A) Demand conditions and Factor intensity
 (B) Technology and Factor intensity
 (C) Factor endowments and Factor intensity
 (D) Factor endowments and Demand conditions
13. Autonomous consumption is
 (A) consumption that does not depend on income
 (B) consumption that depend on income
 (C) consumption that depend on savings
 (D) consumption that does not depend on interest rate
14. The marginal propensity to consume shows
 (A) which proportion of extra wealth is consumed
 (B) which proportion of extra savings is consumed
 (C) which proportion of extra income is consumed
 (D) none of the above
15. According to classical economists
 (A) demand create its own supply
 (B) a free market economy will always reach the state of full employment
 (C) a free market economy will always tends to operate below the state of full employment
 (D) government intervention is needed if there is any unemployment in the economy
16. For a two sector economy, autonomous investment (I) is Rs 100 crores and consumption (C) function is $C=50+0.8Y$. If autonomous consumption fall by 10 and autonomous investment increase by 20 the equilibrium value of income (Y) will be
 (A) Rs. 750 crores (B) Rs. 825 crores (C) Rs. 850 crores (D) Rs. 800 crores
17. Which of the following is a contingent function of money?
 (A) Basis of credit (B) Store of value
 (C) Measure of value (D) Transfer of value
18. Keynesian multiplier process is
 (A) Dynamic in nature (B) Static in nature
 (C) Dynamic-static in nature (D) Induced by external consumption

19. According to Keynesian liquidity preference theory demand for money
- (A) Varies inversely with the income
 - (B) Varies directly with the interest rate
 - (C) Varies inversely with the income and directly with the interest rate
 - (D) Varies inversely with the interest rate and directly with the income
20. M_3 as used by RBI is
- (A) = Currency + demand deposits with the RBI
 - (B) = Currency + demand deposits + time deposits with the RBI
 - (C) = Currency + demand deposits + other miscellaneous deposits of RBI
 - (D) = Currency + demand deposits + time deposits with the banks + other miscellaneous deposits of RBI
21. The longest business cycles in economic activity are known as
- (A) Kondratieff's wave
 - (B) Juglar's investment cycles
 - (C) Kuznets infrastructural investment cycles
 - (D) Johnston's wave
22. Inflation refers to
- (A) a once-and-for-all rise in the general prices
 - (B) a once-and-for-all rise in the industrial and agricultural prices
 - (C) a sustained rise in the general prices
 - (D) a sustained rise in the industrial prices only
23. Which of the following is part of horizontal agricultural activities?
- (A) marketing agricultural produce
 - (B) animal husbandry
 - (C) fish processing
 - (D) distribution of agricultural produce
24. Traditional agriculture according to Schultz is agriculture
- (A) wherein age old technologies are used for cultivation
 - (B) with small farm size and farmers are fatalist
 - (C) in a state of equilibrium
 - (D) all of the above
25. Which of the following is true for central banking?
- (A) An individual can open an account with the central bank.
 - (B) The central bank seeks to promote financial stability of individual industry.
 - (C) The central bank promotes agricultural price and financial stability in the short run.
 - (D) The central bank is bankers' bank and banker to the government.
26. According to Friedman's restatement of quantity theory
- (A) if people expect a higher rate of inflation, they will reduce their money holding.
 - (B) if people expect a higher rate of inflation, they will increase their money holding.
 - (C) greater the wealth of an individual, lower will be demand for money for transaction and other purposes.

- (D) greater the proportion of human wealth to total wealth, higher will be demand for money for transaction and other purposes.
- 27.** Canon of elasticity implies that
- (A) public expenditure should be made in such a manner that society gets major benefits.
 - (B) public expenditure should be fairly elastic and vary according to the needs.
 - (C) public expenditure should stimulate elasticity of demand and productivity in the economy.
 - (D) Government should avoid deficit budgeting by making revenue more elastic.
- 28.** With a regressive tax, as income
- (A) increase, the tax rate decreases
 - (B) decrease, the tax rate remains the same
 - (C) increase, the tax rate remains the same
 - (D) decrease, the tax rate decreases
- 29.** Market structure would be indicated by
- (A) Number of firms
 - (B) Size inequality of firms
 - (C) Barriers to entry
 - (D) All of the above
- 30.** Separation of ownership from control is most likely in the case of
- (A) Proprietorships
 - (B) Partnerships
 - (C) Corporations
 - (D) None of these
- 31.** Disguised unemployment in India is, generally, found in
- (A) secondary sector
 - (B) primary sector
 - (C) tertiary sector
 - (D) all sector of the economy
- 32.** The last Five Year Plan was the
- (A) 10th plan
 - (B) 9th plan
 - (C) 12th plan
 - (D) 13th plan
- 33.** Industrial Policy Resolution that guided the industrial development in India for a long time was
- (A) IPR 1956
 - (B) IPR 1946
 - (C) IPR 1961
 - (D) IPR 1991
- 34.** Green Revolution first started in
- (A) Haryana, West Bengal and Andhra Pradesh
 - (B) Western Uttar Pradesh, Punjab and Haryana
 - (C) Western Uttar Pradesh, Haryana and Andhra Pradesh
 - (D) Punjab and Haryana only
- 35.** The crisis that triggered Economic Reforms in India was
- (A) Banking crisis
 - (B) Mortgage crisis
 - (C) Food security crisis
 - (D) Foreign Exchange crisis
- 36.** Indian economy, at the eve of Independence, was
- (A) a subsistence economy
 - (B) a developed economy
 - (C) an industrial economy
 - (D) a service economy
- 37.** Goods and Services Tax in India comprises

- (A) IGST (B) SGST and CGST
(C) CGST, SGST and IGST (D) TGST, SGST and IGST
38. Consumer Protection Act, was first, enacted in India in
(A) 2005 (B) 1996 (C) 1986 (D) 1976
39. MRTP Act in India was replaced by
(A) Consumer Protection Act (B) Competition Act of India
(C) Monopoly Control Act (D) Industrial Regulation Act
40. India is home to the
(A) highest number of poor in the world (B) least number of poor in the world
(C) minimum poor in Asia (D) all of these
41. The *ordinary least-squares method* (OLS) is a technique
(A) for fitting a non-linear line to the sample of XY observations
(B) for maximising sum of the squared deviations of the sample of XY observations
(C) for fitting a straight line to the sample of XY observations and maximising sum of the squared (vertical) deviations of points from the line
(D) for fitting a straight line to the sample of XY observations
42. *Simple regression analysis* is used for
(A) correlation analysis
(B) testing hypotheses about the relationship between a dependent variable and an independent variable
(C) testing hypotheses about the relationship between a dependent variable and an endogenous variable
(D) testing hypotheses about the relationship between an independent variable and an exogenous variable
43. If estimated sum of square (ESS) is 47.31 and total sum of square (TSS) is 1634, the R^2 is
(A) 0.8728 (B) 0.9562 (C) 0.9710 (D) 0.8567
44. BLUE stands for
(A) Better, Linear and Unbiased estimator (B) Best, Linear and Universal estimator
(C) Biased, Linear and Universal estimator (D) Best, Linear and Unbiased estimator
45. The problem of Heteroscedasticity is more frequently found in case of
(A) Homogenous data (B) Cross sectional data
(C) Time series data (D) Monotonous data
46. Multicollinearity exist if
(A) The overall model is significant but none of the coefficients are significant
(B) The coefficient have the same signs as explained by the theory
(C) Low variance inflation factor but very high tolerance
(D) All of the above

47. If there exist autocorrelation problem in a model
 (A) OLS method of estimation fail
 (B) OLS estimates are linear and biased but variance inflates
 (C) OLS estimates are linear and biased but are consistent
 (D) OLS estimates are linear and unbiased but variance inflates
48. Type II error occur if
 (A) the investigator rejects a null hypothesis that is actually false in the population
 (B) the investigator fails to accept a null hypothesis that is actually true in the population
 (C) the investigator fails to reject a null hypothesis that is actually false in the population
 (D) the investigator rejects a null hypothesis that is actually true in the population
49. What can be done to overcome or reduce the problems resulting from multicollinearity?
 (A) extending the size of the sample data
 (B) dropping one of the highly collinear variables
 (C) transforming the functional relationship
 (D) all of the above
50. Which of the following is not an assumption of a linear regression model?
 (A) The relationship between X and the mean of Y is linear
 (B) The variance of residual is not same for any value of X
 (C) Observations are independent of each other
 (D) For any fixed value of X, Y is normally distributed
51. X introduced Y saying, "He is the husband of the granddaughter of the father of my father". How Y is related to X?
 (A) Brother-in-laws (B) Uncle (C) Brother (D) Sister-in-laws
52. If PIPE is written as 169165 then what is the last digit of SWAN?
 (A) 7 (B) 14 (C) 4 (D) 6
53. Three of the following four words are alike in a certain way and one is different. Select the odd one.
 (A) Goggles (B) Spectacles
 (C) Bifocals (D) Optical Reader
54. Among 200 persons, 70 persons like tea while 128 like coffee and 40 persons like both tea and coffee. How many persons like neither tea nor coffee?
 (A) 36 (B) 42 (C) 28 (D) 52
55. If NOIDA is written as OPJEB, then what will be the code for DELHI?
 (A) EFMIJ (B) EFMJK (C) EFAMK (D) EFMJK
56. The roots of Characteristic Polynomial are not known as
 (A) Characteristic roots (B) Complex roots
 (C) Latent Roots (D) Eigen Values
57. For a rectangle matrix, when number of rows is less than number of columns, i.e., $m < n$, the rank of this matrix can be
 (A) more than or equal to m (B) less than or equal n

- (C) less than or equal to (D) none of these
58. The measure of central tendency where preference to each item of series differs is called
 (A) Geometric Mean (B) Median
 (C) Mode (D) Weighed Mean
59. The marginal propensity to consume is computed as
 (A) differentiation of log of consumption with respect to log of income.
 (B) differentiation of consumption with respect to income.
 (C) integral of log of consumption with respect to log of income.
 (D) integral of Consumption with respect to income.
60. The demand function of a commodity is $y = 36 - x^2$. What would be the consumer's surplus for $y = 11$?
 (A) $205/3$ (B) $28/3$ (C) $250/3$ (D) $21/3$
61. Which of the following term is not synonymous to error term of regression?
 (A) Normal distribution (B) White noise term
 (C) Stochastic term (D) Residual term
62. The measure of decile is a _____ measure
 (A) Dispersion (B) Association (C) Probability (D) Positional
63. Which of the following is not a formula to compute correlation coefficient?
 (A) $\frac{\sum xy}{\sqrt{\sum x^2}}$ (B) $\frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$
 (C) $\frac{n \sum XY - \sum X \sum Y}{\sqrt{n \sum X^2 - (\sum X)^2} \times \sqrt{n \sum Y^2 - (\sum Y)^2}}$ (D) $\sqrt{b_{xy} \times b_{yx}}$
64. Which of the following statement about Arithmetic mean (AM), Geometric Mean (GM) and Harmonic mean (HM) relationship is incorrect?
 (A) $AM \times HM = GM^2$ (B) $HM \geq GM \geq AM$
 (C) $AM \geq GM \geq HM$ (D) $AM = \frac{(GM)^2}{AM}$
65. The price elasticity of demand is 0.5. The percentage change in quantity demanded is 6. What is the percentage change in price?
 (A) 18 (B) 6 (C) 12 (D) 13
66. There are increasing costs of production because
 (A) economic resources are not equally efficient in the production of all goods and services
 (B) economic resources are equally efficient in the production of all goods and services
 (C) during short run only labour and capital are variable factors of production
 (D) during short run economic resources are fixed and equally efficient in the production of all goods and services
67. The production-possibility frontier shifts outward over time due to
 (A) increase in resources available
 (B) unchanged technology only
 (C) reduction in resources available only

(D) reduction in resources available and unchanged technology

68. A normal good is one for which

- (A) demand curve shift downward as income of individual increase *ceteris paribus*
- (B) demand curve shift upward as income of individual increase *ceteris paribus*
- (C) demand curve remains unchanged as income of individual increase *ceteris paribus*
- (D) demand curve becomes horizontal as income of individual increase *ceteris paribus*

69. The coefficient of cross elasticity (e_{xy}) of demand of commodity X with respect to commodity Y is

(A) $e_{xy} = \frac{\Delta Q_x / Q_x}{\Delta Q_y / P_y}$

(B) $e_{xy} = \frac{\Delta Q_x / Q_x}{\Delta P_x / P_y}$

(C) $e_{xy} = \frac{\Delta Q_x / P_x}{\Delta Q_y / P_y}$

(D) $e_{xy} = \frac{\Delta Q_x / Q_x}{\Delta P_y / P_y}$

70. Which of the following is not a market organization that economists usually identify?

- (A) Monopolistic competition
- (B) Oligopoly
- (C) Imperfect competition
- (D) Perfect competition

71. The long-run average cost (LAC) curve shows

- (A) the minimum per-unit cost of producing each level of output when any desired scale of plant can be built.
- (B) the maximum per-unit cost of producing each level of output when scale of plant is fixed.
- (C) the maximum per-unit cost of producing each level of output when any desired scale of plant can be built.
- (D) the minimum per-unit cost of producing each level of output when scale of plant is fixed.

72. For a monopolist

- (A) $MR > P$ and the MR curve lies below the D curve
- (B) $MR < P$ and the MR curve lies above the D curve
- (C) $MR > P$ and the MR curve lies above the D curve
- (D) $MR < P$ and the MR curve lies below the D curve

73. The marginal productivity theory of distribution was firstly formulated in its complete form by

- (A) J.S. Mill
- (B) David Ricardo
- (C) J. B. Clark
- (D) J. M. Keynes

74. According to Modern Theory of Rent, rent accrues to

- (A) land only
- (B) capital only
- (C) both capital and land
- (D) any factor of production

75. The cost of one thing in terms of the alternative given up is called

- (A) production cost
- (B) opportunity cost
- (C) real cost
- (D) nominal cost

x-x-x

Master of Social Work

1. The name by which Ashoka is generally referred to his inscriptions is-
(A) Chakravarti (B) Dharmadeva (C) Dharmakirti (D) Priyadarsi
2. Teachers Day is celebrated on:
(A) 14th November (B) 5th September (C) 10th October (D) 15th September
3. Which temple figured in the news regarding the institution of Devadasi?
(A) Jagannath Temple, Puri (B) Pashupatinath Temple, Kathmandu
(C) Kandariya Mahadev Temple, Khajuraho (D) Chausath Yogini Temple, Bhadaghat
4. The river most mentioned in Early Vedic Literature is:
(A) Sindhu (B) Gomti (C) Sarasvati (D) Ganga
5. Which of the four Vedas contains an account of magical charms and spells?
(A) Rigveda (B) Yajurveda (C) Atharvaveda (D) Samaveda
6. Which describes best the concept of Nirvana in Buddhism?
(A) The complete annihilation of Self
(B) A mental stage beyond all comprehension
(C) The extinction of the fires of attachment, aversion and ignorance
(D) A state of bliss and rest
7. With whose permission did the British set-up their first factory in Surat?
(A) Akbar (B) Jahangir (C) Shahjahan (D) Aurangzeb
8. 'Banjaras' during the medieval period of Indian History were generally:
(A) Agriculturists (B) Warriors (C) Weavers (D) Traders
9. 'Dandiya' is a popular dance of:
(A) Punjab (B) Gujarat (C) Tamil Nadu (D) Maharashtra
10. The words 'Satyameva Jayate' inscribed below the base plate of the emblem of India are from:
(A) Rigveda (B) Satpath Brahmana
(C) Mundak Upanishad (D) Ramayana
11. For which of the following disciplines is Nobel Prize awarded?
(A) Physics and Chemistry (B) Physiology and Medicine
(C) Literature, Peace and Economics (D) All of these
12. The elected members of the Rajya Sabha are elected by:
(A) Lok Sabha (B) Rajya Sabha
(C) Legislative assemblies of the States (D) Ministers
13. The power to decide an election petition is vested in the:
(A) Parliament (B) Supreme Court (C) High Courts (D) Election Commission
14. _____ play an important role in society as they provide social support, a sense of belonging, and opportunities for collaboration and cooperation:
(A) Socialization (B) Institutions (C) Communities (D) Partnership

15. _____ is a capacity building process through which community individuals, groups or organizations participate for their development:
 (A) Element materialization (B) Community Differences
 (C) Community Mobilization (D) Personal modernization
16. Masculinity and Femininity are linked to:
 (A) Sexism (B) Sex (C) Gender (D) Patriarchy
17. For maintaining gender equality in the classroom, a teacher should:
 (A) Provide the same opportunities to both the boys and girls
 (B) Discourage the girls to take part in curricular activities
 (C) Provide analytical work to the girls
 (D) None of the above
18. Gender is:
 (A) A numerical concept (B) Biologically determined
 (C) The same as the sex of the person (D) A social construct
19. Preference or Prejudice towards one gender over the other is termed as:
 (A) Gender role (B) Gender awareness
 (C) Gender bias (D) Gender parity
20. What is Patriarchal society?
 (A) A society dominated by men
 (B) A society dominated by women
 (C) A society where there is equality between men and women
 (D) None of the above
21. Which was the first country to allow women to vote:
 (A) Saudi Arabia (B) India (C) New Zealand (D) Russia
22. The main characteristic of Indian culture is:
 (A) Self-sufficiency (B) Regionalism
 (C) Unity in Diversity (D) Factionalism
23. Which was the main occupation of the Old Stone Age people?
 (A) Dairy farming (B) Agriculture (C) Horticulture (D) Hunting
24. In which State is the Harappan culture site 'Sanauli' located?
 (A) Uttar Pradesh (B) Haryana (C) Gujarat (D) Punjab
25. The most unique feature of the Harappan civilization was the development of ____ :
 (A) Urban centres (B) Culture (C) Villages (D) Rural centres
26. Who established the International Society for Krishna Consciousness (ISKCON)?
 (A) Sri Chaitanya (B) Bhaktivedanta Swami Prabhupada
 (C) Sri Ramakrishna (D) Sri Bhaktisiddhanta Sarasvati
27. The Dargah of which Sufi saint is situated in Ajmer?
 (A) Moinuddin Chisti (B) Baba Farid
 (C) Jahangir (D) Humayun

28. Jalaluddin Rumi, the great Sufi poet of the 13th century, belonged to which country?
 (A) Morocco (B) Iraq (C) Afghanistan (D) Iran
29. Who was the first ruler of Maurya dynasty?
 (A) Bindusara (B) Brihadratha (C) Chandragupta (D) Ashoka
30. Which organization issue the rules of global trade?
 (A) World bank (B) World Trade Organization
 (C) Foreign Exchange Dealer's Association (D) Directorate General of Foreign Trade
31. The Headquarters of International Court of Justice are at:
 (A) Hague (B) New York (C) Geneva (D) Paris
32. Who is the author of the book 'Dreams from My Father: A Story of Race and Inheritance':
 (A) John Evan Aatta Mills (B) Nelson Mandela
 (C) Barrack Obama (D) Dany Boyle
33. The book 'Long Walk to Freedom' is written by:
 (A) Sonia Gandhi (B) L.K. Advani (C) Nelson Mandela (D) Benazir Bhutto
34. 'N' in DNA, a hereditary material in gene, stands for:
 (A) Natural (B) Natriuretic (C) Nervous (D) Nucleotides
35. Nobel Prize was instituted by which country?
 (A) United States of America (B) United Kingdom
 (C) Russia (D) Sweden
36. In the Interim Government formed in 1946, the Vice-President of the Executive Council was:
 (A) Dr. S. Radhakrishnan (B) Rajagopalachari
 (C) Dr. Rajendra Prasad (D) Jawaharlal Nehru
37. In which country was the Indian National Army (I.N.A.) formed?
 (A) Japan (B) Malaysia (C) Singapore (D) Germany
38. Which Article of Directive Principles of State Policy deals with the promotion of International peace and security:
 (A) Article 51 (B) Article 48 A (C) Article 43 A (D) Article 41
39. Geological Survey of India is under the Ministry of:
 (A) Mines (B) Environment and Forests
 (C) Home Affairs (D) Science and Technology
40. For how many years was 'Nelson Mandela' in prison?
 (A) 25 years (B) 27 years (C) 29 years (D) 31 years
41. Soft drinks such as Colas, contain significant quantities of:
 (A) Caffeine (B) Nicotine (C) Tannin (D) Renin
42. People drinking water from a shallow hand-pump, are likely to suffer from all of the following diseases, except:
 (A) Cholera (B) Typhoid (C) Jaundice (D) Fluorosis

43. Fat present below the skin surface in our body, acts as a barrier against:
- (A) Loss of heat from the body
 - (B) Loss of essential body fluids
 - (C) Loss of salts from the body
 - (D) Entry of harmful micro-organisms from the environment
44. The water pollution in river is measured by the dissolved amount of:
- (A) Chlorine
 - (B) Ozone
 - (C) Nitrogen
 - (D) Oxygen
45. Most of the explosions in mines occur due to the mixing of:
- (A) Hydrogen with Oxygen
 - (B) Oxygen with Acetylene
 - (C) Methane with Air
 - (D) Carbon dioxide with Ethane
46. The Best Documentary Short Category Film which won Oscar 2023 is:
- (A) How do you measure a Year
 - (B) The Elephant Whispers
 - (C) Stranger at the Gate
 - (D) The Martha Mitchell Effect
47. As per the United Nations World Population Report 2023, the most populous country in the world is:
- (A) China
 - (B) USA
 - (C) India
 - (D) Brazil
48. APPLE CEO Tim Cook launched the first APPLE retail store in:
- (A) Mumbai
 - (B) Gurugram
 - (C) Chennai
 - (D) Bangalore
49. Which country has highest spending on Military:
- (A) China
 - (B) United States of America
 - (C) Russia
 - (D) United Kingdom
50. What country has largest number of Nuclear warheads?
- (A) China
 - (B) United States of America
 - (C) Russia
 - (D) United Kingdom
51. First Battle of Panipat was fought in the year:
- (A) 1526
 - (B) 1556
 - (C) 1761
 - (D) 1781
52. The Rights of Persons with Disabilities Act (RPWD) 2016 was made open to public on:
- (A) January 25, 2016
 - (B) April 27, 2016
 - (C) August 15, 2016
 - (D) December 28, 2016
53. Under the RPWD 2016 Act number of disabilities listed are:
- (A) 7
 - (B) 9
 - (C) 16
 - (D) 21
54. RTE Act 2009 was enacted on-
- (A) 12th April 2009
 - (B) 4th August 2009
 - (C) 15th September 2009
 - (D) 28th December 2009
55. Stephen Hawkins was suffering from-
- (A) Asperger Syndrome
 - (B) Dyslexia
 - (C) Dyscalculia
 - (D) Amyotrophic Lateral Sclerosis

56. Tommy Hilfiger is suffering from-
 (A) Traumatic brain injury (B) Dyslexia
 (C) Deafness (D) Mental disorder
57. Every year World Liver Day is observed on:
 (A) February 18 (B) March 8 (C) April 19 (D) May 10
58. When is National Girl Child Day of India observed:
 (A) January 25 (B) January 24 (C) October 24 (D) November 14
59. When is World Population Day observed?
 (A) July 8 (B) July 10 (C) July 11 (D) July 19
60. When is 'Quit India Day' celebrated ?
 (A) September 8 (B) August 19 (C) August 8 (D) None of these
61. 'World Disability Day' is observed annually on:
 (A) December 10 (B) December 3 (C) November 29 (D) December 15
62. 'Army Day' is celebrated in India on:
 (A) January 20 (B) January 12 (C) January 15 (D) December 26
63. Rainbow consists of how many colours?
 (A) 6 (B) 7 (C) 8 (D) 9
64. Who is known as the "Father of White Revolution" in India?
 (A) Tribhuvandas Kishibhai Patel (B) Harichand Megha Dalaya
 (C) Verghese Kurien (D) None of these
65. Who was the first woman to become a judge of the Supreme Court of India?
 (A) Fathima Beevi (B) Indira Banerjee
 (C) Hima Kohli (D) Bela Trivedi
66. Who was the first woman governor of any Indian state?
 (A) Sarojini Naidu (B) Padmaja Naidu
 (C) Vijayalakshmi Pandit (D) Sharda Mukherje
67. Kaziranga National Park is located in Which Indian State?
 (A) Uttarakhand (B) Assam (C) Andhra Pradesh (D) Rajasthan
68. Who said "Man is a Social Animal"?
 (A) Plato (B) Comte (C) Socrates (D) Aristotle
69. What is the type of control organised through bureaucracy?
 (A) Officials (B) Informal (C) Formal (D) Court
70. What percentage of women workforce in India is engaged in informal sector?
 (A) Around 65% (B) Around 70% (C) Around 85% (D) Around 92%
71. Globalization refers to:
 (A) Global low income (B) More integrated and interdependent world
 (C) Global warming (D) Low foreign trade and investment
72. Which is not an element of community?
 (A) We-feeling (B) Cultural Diversity

(C) Territory

(D) Self-sufficiency

73. When two people interact with each other, they form:

(A) A society (B) An institution (C) An association (D) A dyadic group

74. Which one of the following is not a reason for declining sex ratio in India?

(A) Gender role stereotyping and traditional role expectations

(B) Practice of Dowry and Prevalence of illiteracy

(C) Migration of female work force from rural to urban areas

(D) Sex selective abortion

75. Which is not a part of Gandhian path of development?

(A) Social Trusteeship

(B) Non-Violence

(C) Cooperative Conflict

(D) Constructive work

x-x-x

M.Sc. Statistics

1. The mean of Geometric distribution with probability p is
 (A) $1/p$ (B) $(1-p)/p$ (C) $1/(1-p)$ (D) $p/(1-p)$
2. If T is linear transformation from vector space V into vector space W over the field F , $\dim V = m$ and $\dim W = n$, then rank of T is
 (A) $m + \text{nullity}(T)$ (B) $n + \text{nullity}(T)$
 (C) $m - \text{nullity}(T)$ (D) $n - \text{nullity}(T)$
3. Let X be a random variable with mean 2 and S.D. 3. Then $P\{-3 \leq X \leq 7\}$ is
 (A) at most equal to $\frac{9}{25}$ (B) at least equal to $\frac{16}{25}$
 (C) $\frac{16}{25}$ (D) $\frac{7}{25}$
4. For the bivariate distribution of continuous random variables X and Y . The joint pdf of X and Y is bivariate normal then
 (A) X and Y are uncorrelated then they are independent, if and only if, their joint distribution is bivariate normal
 (B) The joint pdf of X and Y is bivariate normal, if and only if, each marginal pdf is normal
 (C) $X + Y$ and $X - Y$ are independently distributed
 (D) $X + Y$ and X are independently distributed
5. Let A and B , $N = 140$, $(A) = 100$, $(B) = 105$ and $(AB) = 25$, the attributes A and B are
 (A) Positively associated (B) Negatively associated
 (C) Dependent (D) Independent
6. Subway trains on a certain line run every half hour between mid night and six in the morning. What is the probability that a man entering the station at a random time during this period will have to wait at least twenty minutes?
 (A) $2/3$ (B) $2/6$ (C) $1/6$ (D) $1/3$
7. What happens to the standard deviation when one increases the frequencies in the two tails of a distribution?
 (A) Standard deviation decreases
 (B) Standard deviation is not affected
 (C) Standard deviation increases
 (D) Standard deviation is not affected as long as the Increases are balanced on each side of the mean
8. Given three sets of data $X = \{5, 8, 12\}$, $Y = \{-1, 2, 6\}$, $Z = \{1, 2.5, 4.5\}$. Let σ_1 , σ_2 and σ_3 be standard deviations of the data sets X , Y and Z respectively. Which one of the following is correct?
 (A) $\sigma_1 = \sigma_2 = \sigma_3$ (B) $\sigma_1 > \sigma_2 > \sigma_3$
 (C) $\sigma_1 = \sigma_2$, $\sigma_3 = \frac{\sigma_1}{2}$ (D) $\sigma_1 = \sigma_2/2$, $\sigma_1 = \sigma_3$
9. The random variable X takes the value 0, 1, 2 and 3 with probabilities $\frac{1}{125}$, $\frac{12}{125}$, $\frac{48}{125}$ and $\frac{64}{125}$, then the value of $E(X)$ is
 (A) $\frac{17}{5}$ (B) $\frac{\sqrt{17}}{5}$ (C) $\frac{12}{6}$ (D) $\frac{12}{5}$

10. Let X_1 and X_2 are two variates with variances σ_1^2 and σ_2^2 respectively, and ρ is the correlation coefficient between them. If $u = x_1 + \frac{\sigma_1}{\sigma_2}x_2$ and $v = x_1 - \frac{\sigma_1}{\sigma_2}x_2$; then the correlation coefficient between u and v is:
 (A) ρ (B) $1 - \rho$ (C) $\frac{1+\rho}{2}$ (D) 0
11. Suppose three observations on the ordered pair (x, y) yielded $(0, -1)$, $(-1, 0)$ and $(1, 1)$. The least squares estimate of β in fitting the line of the form $Y = \beta X$ is
 (A) $-\frac{1}{2}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) 1
12. If $P(A) = 1/3$ and $P(B^c) = 1/4$, then
 (A) A and B be disjoint (B) A and B are mutually exclusive
 (C) both (A) and (B) (D) A and B are independent
13. Three houses are available in a locality for allotment. Three persons applied for a house. The probability that each applied for a different house is
 (A) $1/3$ (B) $1/9$ (C) $1/27$ (D) 1
14. Let $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}$. Then eigen values of A are
 (A) $4, -2 \pm \sqrt{7}$ (B) 7, 3, 1 (C) $4, -4 \pm \sqrt{13}$ (D) -2, 3, 6
15. An approximate relation between mean deviation (M.D.) and standard deviation (S.D.) of normal distribution is
 (A) 5 M.D. = 4 S.D. (B) 4 M.D. = 5 S.D. (C) 2 M.D. = 3 S.D. (D) 3 M.D. = 2 S.D.
16. Let $A = \begin{pmatrix} 1 & -1 & 1 \\ 1 & 1 & 1 \\ 2 & 3 & \alpha \end{pmatrix}$ and $b = \begin{pmatrix} 1 \\ 3 \\ \beta \end{pmatrix}$ then the system $AX = b$ over the real numbers has
 (A) no solution whenever $\beta \neq 7$
 (B) an infinite number of solutions whenever $\alpha \neq 2$
 (C) an infinite number of solutions if $\alpha = 2$ and $\beta \neq 7$
 (D) a unique solution if $\alpha \neq 2$
17. If matrix A and B are of same order, then the follow operation does not holds
 (A) $(AB)^n = A^n B^n$ (B) $(A + B)^n = A^n + B^n$
 (C) $(AB)^n = B^n$ (D) None of these
18. An unbiased coin is tossed four times. The probability that number of heads exceeds the number of tails is
 (A) $1/12$ (B) $3/4$ (C) $3/8$ (D) $5/16$
19. If A is any n -order square matrix, and $|A| \neq 0$ then
 (A) $|\text{adj } A| = |A|^{n-1}$ (B) $|\text{adj } A| = 1$
 (C) $|\text{adj } A| = |A|^n$ (D) $|\text{adj } A| = 0$
20. Given that the correlation coefficient between X and Y is $\frac{1}{3}$, $\sigma_x^2 = \alpha$, $\sigma_y^2 = 4\alpha$, $\sigma_z^2 = 114$, where $Z = 3X - 4Y$. What is the value α ?
 (A) 1 (B) -1 (C) -2 (D) 2

21. Given X is a random variable with finite variance and $Y = (100 - X)$. What is the correlation coefficient between X and $Z = (X + Y)X$?

- (A) -1 (B) 0 (C) $\frac{1}{100}$ (D) 1

22. The characteristic root of Hermitian matrix are all

- (A) Complex (B) Real (C) Zero (D) Complex &

Real

23. Let X be a continuous random variable with cdf $F(\cdot)$. Let $Y = F(X)$, then $E(Y)$ equals

- (A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{1}{12}$ (D) 1

24. If we have a data on n families each with k members and if r is the intraclass correlation, then which of the following is the range of r ?

- (A) $-1 \leq r \leq 1$ (B) $0 \leq r \leq 1$
(C) $\frac{-1}{k-1} \leq r \leq \frac{1}{k+1}$ (D) $\frac{-1}{k-1} \leq r \leq 1$

25. The following vectors $(0,5,-1)$, $(-3,8,16)$ and $(9,56,-64)$ are

- (A) Linearly dependent (B) Linearly independent
(C) Constant (D) Can not say

26. Let A be a square matrix of order n , then the matrix is said to be orthogonal if

- (A) $AA^T = 0$ (B) $AA^{-1} = 0$ (C) $AA^T = I$ (D) $AA^{-1} = I$

27. If A is any n -order square matrix, then $\det(kA)$ is equal to

- (A) $k \det(A)$ (B) k (C) $k^n \det(A)$ (D) $k^{n-1} \det(A)$

28. Let A is a $(n \times 1)$ non zero matrix and B is a $(1 \times n)$ non zero matrix, then

- (A) $\text{Rank}(AB)=1$ (B) $\text{Rank}(AB) = n$ (C) $\text{Rank}(AB) = 0$ (D) $\text{Rank}(AB) = n -$

1

29. Which one of the following measures is appropriate when the relationship between two variables is linear

- (A) Correlation coefficient (B) Rank correlation
(C) Intraclass correlation (D) both (A) and (B)

30. If $\bar{z}$ is the complex conjugate of z , then

- (A) $\bar{z}z = z^2$ (B) $\bar{z}z = |z|^2$ (C) $z = |z|\bar{z}$ (D) $z = |z|^2\bar{z}$

31. The complement of unit circle $|z| = 1$ is

- (A) open set (B) closed set (C) semi open (D) semi closed

32. The polar representation of $\left(\frac{12+16}{8-6i}\right)^2$ is

- (A) $2\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)$ (B) $2^2\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)$
(C) $2(\cos\pi + i\sin\pi)$ (D) $2^2(\cos\pi + i\sin\pi)$

33. For the complex numbers z_1 and z_2 , $\arg(z_1z_2)$ is equal to

- (A) $\arg z_1 \arg z_2$ (B) $\arg z_1 + \arg z_2$ (C) $\arg z_1 - \arg z_2$ (D) $\arg(z_1 + z_2)$

34. $(1+i)^{10} + (1-i)^{10}$ is

- (A) -1 (B) 1 (C) 0 (D) 2

35. If $1, \omega, \omega^2$ are cube roots of unity, then $(x - y)(x - \omega y)(x - \omega^2 y)$ is equal to
 (A) $x - y$ (B) $x^2 - y^2$ (C) $x^3 - y^3$ (D) $x^3 + y^3$
36. The locus of the complex number satisfying $\arg \frac{z-1}{z+1} = \frac{\pi}{3}$ is a
 (A) Straight line (B) Circle (C) Parabola (D) Hyperbola
37. The radius of convergence of the power series $f(z) = \sum_{n=1}^{\infty} \frac{n+1}{(n+2)(n+3)} (z)^n$ is
 (A) 2 (B) 3 (C) 1 (D) 4
38. Let X_1, X_2, X_3 are uncorrelated variables each having the same standard deviation. The correlation coefficient between $X_1 + X_2$ and $X_2 + X_3$ is given by
 (A) ρ (B) $1 - \rho$ (C) $\frac{1+\rho}{2}$ (D) $\frac{1}{2}$
39. The series $\sum_{n=1}^{\infty} n^2 \left(\frac{i}{2}\right)^n$ is
 (A) convergent (B) divergent (C) bounded (D) unbounded
40. The value of the integral $\oint_C \tan z \, dz$ in the circle $|z| = 2$
 (A) 1 (B) $4\pi i$ (C) 0 (D) $-4\pi i$
41. What is the order and degree of a differential equation $\frac{d^2 y}{dx^2} + n^2 x = 0$?
 (A) First order, Second degree (B) First order, First degree
 (C) Second order, First degree (D) Second order, Second degree
42. The linearity principle for ordinary differential equation holds for
 (A) Non-homogeneous equation (B) Non-Linear equation
 (C) Linear differential equation (D) Homogeneous equation
43. $\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 4y = 50e^{2x}$, has the solution
 (A) $y = 25x^2 e^{2x} + (A + Bx)e^{2x}$ (B) $y = 25x^2 e^{-2x} + (A - Bx) - e^{2x}$
 (C) $y = 50x^2 e^{2x} + (A + Bx)e^{2x}$ (D) $y = 50x^2 e^{-2x} + (A - Bx) - e^{2x}$
44. Solving by variation of parameter for the equation $y'' - 2y' + y = e^x \log x$, the value of Wronskian is
 (A) e^{2x} (B) e^{-2x} (C) -2 (D) 2
45. The domain of convergence of the series $\frac{x}{1} - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} \dots$
 (A) (1,-1) (B) (1,-1] (C) [1,-1] (D) [1,-1)
46. The sequence $\left\{\frac{(n)^p}{n!}\right\}_1^{\infty}$ is
 (A) convergent (B) not convergent (C) divergent (D) can not say
47. A function $f(x) = |x|$ is
 (A) Discontinuous (B) Discontinuous at $x=0$
 (C) Continuous everywhere (D) Continuous at $x=0$
48. If f is a Riemann integrable function on $[a, b]$ and λ is any real number then following holds:

- (A) $\lambda \int_a^b f(x)dx = \int_a^b \lambda f(x)dx$ (B) $\lambda \int_a^b f(x)dx \neq \int_a^b \lambda f(x)dx$
 (C) $\lambda \int_a^b f(x)dx \geq \int_a^b \lambda f(x)dx$ (D) $\lambda \int_a^b f(x)dx \leq \int_a^b \lambda f(x)dx$

49. If $x \in S$, a non-empty set of real numbers then

- (A) $\inf x = \sup x$ (B) $\inf x = -\sup(-x)$
 (C) $\inf x = -\sup x$ (D) $\inf x = \sup(-x)$

50. The sequence $\left\{\sin \frac{\pi}{n}\right\}$ is

- (A) convergent to 0 (B) divergent (C) oscillating (D) convergent to 1

51. If an alternate series converges to 0 and $\{S_n\}$ denotes sequence of its partial sum, then which of the following statement is true?

- (A) $S_n > 0$ for all but finite number of terms of sequence $\{S_n\}$
 (B) $S_n < 0$ for all but finite number of terms of sequence $\{S_n\}$
 (C) $S_n > 0$ and $S_n < 0$ for all but finite number of terms of sequence $\{S_n\}$
 (D) $S_n = 0$ for infinitely many terms of the sequence

52. The series $\sum \frac{1}{n^p} \sin \frac{1}{n}$ is convergent if

- (A) $p + 1 > 0$ (B) $p > 0$ (C) $p + 1 > 0$ (D) $p > 1$

53. Suppose $f: [a, b] \rightarrow R$ is continuous on $[a, b]$ and f is differentiable on (a, b) . If $f(a) = f(b) = 0$, there is $c \in (a, b)$ such that $f'(c) = 0$. This is statement of

- (A) Rolle's Theorem (B) Mean Value Theorem
 (C) Intermediate Value Theorem (D) Darboux Theorem

54. If $X \sim b\left(3, \frac{1}{3}\right)$ and $Y \sim b\left(5, \frac{1}{3}\right)$, the probability of $P(X + Y \geq 1)$ is

- (A) $\left(\frac{2}{3}\right)^8$ (B) $1 - \left(\frac{2}{3}\right)^8$ (C) $\left(\frac{1}{3}\right)^8$ (D) $1 - \left(\frac{1}{3}\right)^8$

55. If $\cos(\alpha + \beta) = \frac{4}{5}$, $\sin(\alpha - \beta) = \frac{5}{13}$ and α and β lie between 0 and $\frac{\pi}{4}$, then $\tan 2\alpha$ is

- (A) $\frac{56}{33}$ (B) $\frac{33}{56}$ (C) $\frac{53}{36}$ (D) $\frac{36}{53}$

56. In a triangle ABC, if $a \cos A = b \cos B$, the triangle is

- (A) either isosceles or equilateral (B) either isosceles or right angled
 (C) either equilateral or obtuse angle triangle (D) either equilateral or right angled

57. $3^{2n} + 7$ is divisible by

- (A) 7 (B) 8 (C) 3 (D) 5

58. The tenth term in the binomial expansion of $\left(2x^2 + \frac{1}{x}\right)^{12}$ is

- (A) $\frac{1760}{x^3}$ (B) $\frac{1560}{x^3}$ (C) $\frac{1760}{x^4}$ (D) $\frac{1760}{x^5}$

59. The diameter of a circle is $\sqrt[3]{2}$. The side of a square inscribed in it is

- (A) 4 (B) 3 (C) 2 (D) 5

60. The value of $\lim_{x \rightarrow 0} \frac{\sqrt{x^2+1}-1}{\sqrt{x^2+9}-3}$ is

- (A) 6 (B) 1 (C) 3 (D) 2

61. The equation $x^2 + 3xy + 2y^2 + 2x + 3y + 1 = 0$ represents

- (A) An ellipse (B) A parabola (C) A hyperbola (D) A pair of straight line

62. The value of $\lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x^2}$ is
 (A) 0 (B) 1 (C) 2 (D) 3
63. How many diagonals are there in a polygon with n sides?
 (A) n (B) $n - 1$ (C) $\frac{n(n-3)}{2}$ (D) $\frac{n-3}{2}$
64. In the rectangular Cartesian axes A is (x_1, y_1) where $x_1 = 1$ on the curve $y = x^2 + x + 10$ and tangent of A cuts the x -axis at B , the value of $\overrightarrow{OA} \cdot \overrightarrow{AB}$ is
 (A) $-\frac{520}{3}$ (B) -148 (C) 140 (D) 12
65. The relationship between mean, μ variance σ^2 and second moment about origin μ'_2 is
 (A) $\sigma^2 = \mu'_2 - \mu$ (B) $\sigma^2 = \mu - \mu'_2$ (C) $\sigma^2 = \mu + \mu'_2$ (D) $\sigma^2 = \mu'_2 - \mu^2$
66. If W_1 and W_2 are two subspaces of a vector space then
 (A) $\dim(W_1 + W_2) \leq \dim(W_1) + \dim(W_2)$
 (B) $\dim(W_1 + W_2) \geq \dim(W_1) + \dim(W_2)$
 (C) $\dim(W_1 + W_2) = \dim(W_1) + \dim(W_2)$
 (D) $\dim(W_1 + W_2) = \dim(W_1) - \dim(W_2)$
67. Let $X \sim b(n, q)$, the distribution of $Y = (n - X)$ is
 (A) $b(n, 1)$ (B) $b(n, x)$ (C) $b(n - x, q)$ (D) $b(n, 1 - q)$
68. A linear transformation T from V to W are isomorphic iff
 (A) Into (B) Onto (C) One-One (D) One-One and Onto
69. An eigenvector of the matrix $A = \begin{pmatrix} 3 & 2 & 0 \\ 0 & 2 & 2 \\ 0 & 0 & 2 \end{pmatrix}$ is
 (A) $(1 \ 0 \ 0)'$ (B) $(0 \ 1 \ 0)'$ (C) $(0 \ 0 \ 1)'$ (D) $(1 \ 1 \ 1)'$
70. A family of parametric distributions in which mean is equal to variance is
 (A) Binomial distribution (B) Normal distribution
 (C) Poisson distribution (D) Negative binomial
71. The rank of matrix $A = \begin{pmatrix} 2 & 1 & 0 & 2 \\ -2 & -1 & 1 & 1 \\ 2 & 1 & -3 & -7 \\ 2 & 1 & -2 & -4 \end{pmatrix}$ is
 (A) 4 (B) 3 (C) 2 (D) 1
72. The completeness axiom states
 (A) Every non-empty set S of real number which is bounded have no infimum
 (B) Every non-empty set S of real number which is bounded has infimum
 (C) Every non-empty set S of real number which is bounded have no supremum
 (D) Every non-empty set S of real number which is bounded has supremum
73. If f_1 and f_2 are two real valued bounded function defined on $[a, b]$, then for every partition P on $[a, b]$
 (A) $U(P, f_1 + f_2) = U(P, f_1) + U(P, f_2)$ (B) $U(P, f_1 + f_2) \leq U(P, f_1) + U(P, f_2)$

$$(C) U(P, f_1 + f_2) = U(P, f_1) - U(P, f_2) \quad (D) U(P, f_1 + f_2) \geq U(P, f_1) + U(P, f_2)$$

74. If a set A has n elements, then total number of subsets of A is

- (A) n (B) $2n$ (C) 2^n (D) n^2

75. If for a binomial distribution $b(n, p)$ mean is 4 and variance is 3, the mode is:

- (A) 4 (B) 5 (C) 3 (D) 2

$x-x-x$

MSc(2Yr)(Stem Cell & Tissue Engineering)

1. Which of the following is a fatty acid?
(A) Cytosine (B) Acetic acid (C) Palmitic acid (D) Adenine
2. Insulin is secreted by the following cells.
(A) Pancreatic α - cells (B) Liver cells
(C) Pancreatic β - cells (D) Intestinal cells
3. In eukaryotic animal cells the hydrolases are present in which of the following?
(A) Mitochondria (B) Plasma membrane (C) Lysosomes (D) Nucleus
4. The condensed part of the nuclear material is known as
(A) Histone (B) Nucleosome (C) Euchromatin (D) Heterochromatin
5. During Anaphase – I stage of Meiosis-I, _____ migrate towards opposite poles of the dividing cell.
(A) Sister Chromatids (B) Chromosomes (C) Kinetochors (D) Centromeres
6. During cell division the crossing over event takes place in which of the following
(A) Mitosis-I (B) Meiosis-I (C) Mitosis-II (D) Meiosis-II
7. Which enzyme synthesizes the Okazaki fragments during DNA replication in *E. coli*?
(A) DNA polymerase I (B) DNA polymerase II
(C) DNA polymerase III (D) DNA Ligase
8. Starch is a polymer of
(A) glucose (B) aminoacids (C) fattyacids (D) nucleotides
9. Glucose gets converted to Glucose-6-phosphatate. This step of glycolysis is catalyzed by which enzyme?
(A) Catalase (B) Glucose – 6 – phosphatase
(C) Hexokinase (D) Glucose-6-phosphokinase
10. The Beer - Lambert Law states that the absorbance is proportional to
(A) only the concentration of absorber
(B) only the thickness of absorber
(C) the concentration of absorber as well as the thickness of absorber
(D) the ratio of intensities of transmitted and incident light
11. What happens when a given mixture of positively charged and negatively charged proteins is passed through a Cation-exchange Chromatography column?
(A) Positively charged proteins bind to the column
(B) Negatively charged proteins bind to the column
(C) Positively charged proteins do not bind to the column
(D) Anionic proteins bind to the column
12. Which of the following cell mediates phagocytosis?
(A) Macrophages (B) Basophils (C) Mast cells (D) T cells
13. All of the following are granulocytes except

- (A) Neutrophils (B) Eosinophils (C) Basophils (D) B cells
14. The enzyme that removes nucleotides one at a time from the end of a DNA molecule is called
 (A) Exonuclease (B) Klenow fragment
 (C) Restriction endonuclease (D) Ligase
15. In the eukaryotic chromosomes the sister chromatids are joined through _____
 (A) chromomere (B) telomere (C) centromere (D) nucleosome
16. Which of the following constitutes the small subunit of prokaryotic ribosomes?
 (A) 50S (B) 16S (C) 23S (D) 30S
17. Enzyme that cuts at a specific recognition sequence of DNA molecule is called
 (A) Exonuclease (B) Ligase
 (C) Restriction endonuclease (D) DNase I
18. All of the following are non-essential aminoacids except
 (A) Alanine (B) Glycine (C) Phenylalanine (D) Serine
19. The transportation of polar molecules across the plasma membrane down the electrochemical gradient with the help of a transporter molecule is called
 (A) Simple diffusion (B) Active transport
 (C) Facilitated diffusion (D) Crossing over
20. For plants and animals, Sodium ion (Na^+) is a _____
 (A) micromineral (B) macromineral (C) nitrogen source (D) carbon source
21. When a detergent is mixed with water then it results in the formation of these
 (A) Vesicle filled with water in the interior (B) Liposomes
 (C) Micelles (D) Membrane
22. If the cell is put in a hypertonic solution then what would happen to this cell?
 (A) It will shrink (B) It will swell
 (C) It will not undergo any change (D) Water will move into the cell
23. If the two solutions differ in their pH values by one pH unit then one solution has _____ time(s) the H^+ concentration of the other.
 (A) one (B) ten (C) hundred (D) 1/10
24. In the Acetic acid – Sodium acetate buffer, which of the following acts as proton acceptor?
 (A) Acetic acid (B) Acetate ion (C) CO_3^{2-} (D) HCO_3^-
25. Following the Fischer's classification, the L-aminoacids are those which have α -amino group on the
 (A) right
 (B) left
 (C) centre

- (D) same position about the chiral carbon as does the aldehyde group of L- glyceraldehydes
26. When three aminoacids are joined through two peptide bonds then the molecule formed is called
 (A) monopeptide (B) dipeptide (C) tripeptide (D) tetrapeptide
27. After SDS-PAGE the proteins are visualized by adding a dye such as
 (A) Bromophenol blue (B) Coomassie blue
 (C) Methylene blue (D) Xylene cyanol
28. The Iron atom is found in which of the following molecule?
 (A) Starch (B) Lysozyme (C) RNA (D) Hemoglobin
29. In eukaryotes, the poly(A) tail is added to the primary mRNA transcript by
 (A) Ribosomes
 (B) DNA polymerase
 (C) Polyadenylate polymerase (Poly (A) polymerase)
 (D) RNA polymerase
30. The important feature of an alpha helix is that
 (A) it is the secondary structure of protein
 (B) it is the primary structure of protein
 (C) it is the secondary structure of carbohydrate
 (D) it is the primary structure of carbohydrate
31. The deficiency of Vitamin D leads to the following disease
 (A) Beriberi (B) Rickets (C) Night Blindness (D) Pernicious anemia
32. Cholera is caused by which of the following microorganism?
 (A) *Vibrio cholerae* (B) *Mycobacterium tuberculosis*
 (C) *Pseudomonas aeruginosa* (D) *Corynebacterium diphtheriae*
33. Trisomy of chromosome 21 causes which of the following genetic disorder?
 (A) Turner Syndrome (B) Down Syndrome
 (C) Cerebral palsy (D) Muscular dystrophy
34. The eukaryotic plasma membrane contains all of the following except
 (A) Lipids (B) Proteins
 (C) Cholesterol (D) Elongation Factor Tu (EF Tu)
35. The denaturation of a DNA molecule occurs due the following phenomena
 (A) disruption of phosphodiester bonds (B) disruption of hydrogen bonds
 (C) disruption of disulfide bonds (D) disruption of N-glycosidic bonds
36. In eukaryotic cells, the centrioles give rise to _____ during mitosis.

(A) proteins (B) RNA (C) nuclear membrane (D) spindle fibers

37. Which of the following organ contains acidic pH?

(A) Bone (B) Kidney (C) Liver (D) Stomach

38. The characteristic feature of skeletal muscle cell is that they are

- (A) Branched and mononucleated cells
- (B) Unbranched and mononucleated cells
- (C) Branched and multinucleated cells
- (D) Unbranched and multinucleated cells

39. The enzyme pepsin catalyzes the following reaction

- (A) phosphorylates the protein (B) dephosphorylates the protein
- (C) protein digestion (D) joins two proteins

40. The antibody is secreted by which cells?

(A) Neutrophils (B) Macrophages (C) B cells (D) T cells

41. In prokaryotes, the DNA synthesis begins at the following region of the DNA molecule.

- (A) Leader sequence (B) Kozak sequence
- (C) Shine Delgarno sequence (D) Ori C

42. This is one of the major protein of muscle cells.

- (A) Bovine serum albumin (B) Actin
- (C) Lysozyme (D) IgG

43. The transfer RNA (tRNA) acts as a carrier of _____.

- (A) aminoacyl residues (B) glucose
- (C) nucleotides (D) fattyacids

44. The enzyme linked immunosorbent assay (ELISA) requires the use of which of the following?

- (A) Enzyme linked to antibody
- (B) Enzyme linked to inhibitor
- (C) Enzyme linked to Sodium Dodecyl Sulfate (SDS)
- (D) product linked to enzyme

45. The inactive precursor of an enzyme is called

- (A) Ribozyme (B) Zymogen (C) Inhibitor (D) Abzyme

46. The tricarboxylic acid (TCA) cycle of glucose metabolism occurs in which compartment of the eukaryotic cell?

- (A) Plasma membrane (B) Cytosol (C) Mitochondria (D) Nucleus

47. Which of the following base is pyrimidine base?

- (A) Adenine (B) Inosine (C) Cytosine (D) Guanine

48. DNA is the bearer of genetic information was first experimentally demonstrated by whom?

- (A) Beadle and Tatum (B) Watson and Crick
(C) Avery, MacLeod and McCarty (D) Sanger
49. The process by which the foreign DNA is introduced into the bacterial cell with the help of Calcium chloride is called
(A) transduction (B) transformation
(C) conjugation (D) electroporation
50. Cellulose is hydrolyzed by the enzyme called
(A) Protease (B) Cellulase (C) Ligase (D) Lysozyme
51. _____ are the organisms that can use carbon dioxide from the atmosphere as their sole source of carbon, from which they construct all their carbon-containing biomolecules.
(A) Heterotrophs (B) Autotrophs (C) Parasites (D) Multicellular animals
52. In prokaryotes which subunit of RNA polymerase is required during the initiation of transcription?
(A) α (B) β (C) γ (D) σ
53. The sequence of bases in the Start codon is
(A) AUG (B) UGG (C) UAA (D) AGG
54. Which enzyme is used in DNA sequencing?
(A) EcoRI (B) Bam HI (C) DNase I (D) DNA polymerase
55. All of the following cell organelles contain one membrane, except
(A) Lysosome (B) Mitochondria
(C) Endoplasmic reticulum (D) Golgi complex
56. The EDTA is used for chelating the following ion.
(A) Na^+ (B) K^+ (C) Cl^- (D) Ca^{2+}
57. Which of the following cell junction creates Blood – Brain barrier?
(A) Desmosomes (B) Hemidesmosomes
(C) Tight junctions (D) Gap junctions
58. The finger like projections of the cell which is mediating phagocytosis are called
(A) pseudopodia (B) cilia (C) flagella (D) villi
59. Which of the following statement regarding cilia and flagella is not correct?
(A) cilia is present in eukaryotic cells (B) cilia is present in prokaryotic cells
(C) Flagella is present in eukaryotic cells (D) Flagella is present in prokaryotic cells
60. Clathrin coated vesicles are primarily involved in
(A) Glycosylation (B) Phosphorylation
(C) Transportation (D) Ubiquitination
61. The enzyme that hydrolyses RNA is known as
(A) RNA polymerase (B) DNA ligase
(C) Reverse transcriptase (D) Ribonuclease

62. The Bowman's capsule is found in which of the followings?
 (A) Liver lobules (B) Thymus (C) Nephrons (D) Lymphnodes
63. The innate immunity is provided by
 (A) Skin (B) T cells (C) B cells (D) Spleen
64. Glycogen is _____ polymer of _____
 (A) unbranched, glucose (B) branched, glucose
 (C) unbranched, galactose (D) branched, galactose
65. Where is the enzyme Succinate dehydrogenase (SDH) present within the eukaryotic cell?
 (A) Membrane of mitochondria (B) Endoplasmic reticulum (E.R.)
 (C) Cytosol (D) Lysosome
66. Identify the enzyme that catalyzes the anaplerotic reaction in the eukaryotic cell.
 (A) Pyruvate dehydrogenase complex (B) Citrate synthase
 (C) Malate dehydrogenase (D) Pyruvate carboxylase
67. Biotin acts as a coenzyme for the enzymes that catalyze the following reaction
 (A) Phosphorylation (B) Dephosphorylation
 (C) Oxidation (D) Carboxylation
68. The dietary lipids are digested in small intestine and fatty acids are released which are then absorbed by the intestinal cells and then packaged and delivered to muscle and adipose tissue in the form of _____.
 (A) LDL (B) VLDL (C) Chylomicrons (D) HDL
69. The radioisotope such as ^{125}I is classified as _____.
 (A) β -emitter (B) γ -emitter (C) X-ray – emitter (D) α -emitter
70. When two molecules X (76 Kilo dalton) and Y (144 dalton) are separated with the help of Gel exclusion chromatography then which of the following is true?
 (A) X gets eluted first (B) Y gets eluted first
 (C) Both X and Y are eluted together (D) Both X and Y do not get eluted
71. How many grams of Glucose are required to prepare 500ml of 2.5M solution of Glucose? (Molecular mass of Glucose is 180 dalton)
 (A) 900gm (B) 225gm (C) 450gm (D) 2.5gm
72. In the Polymerase Chain Reaction (PCR), the annealing temperature refers to the following
 (A) The temperature at which the two strands of template DNA anneal
 (B) The temperature at which the two strands of template DNA separate from each other
 (C) The temperature at which the primers attach to the template DNA
 (D) The temperature at which DNA synthesis occurs
73. The RNA is converted to cDNA molecule by which enzyme?
 (A) Polynucleotide kinase (B) Alkaline phosphatase

(C) Terminal deoxynucleotidyl transferase (D) Reverse transcriptase

74. Which enzyme is used for joining two DNA fragments?

- (A) Klenow fragment (B) DNA polymerase I
(C) DNA polymerase III (D) DNA ligase

75. All of the following are vector DNA molecules except

- (A) pBR322 (B) pUC 18 (C) pUC 19 (D) EcoR1

x-x-x

MSc(2Yr)(Instrumentation)

1. A photoelectric cell is a device which
 - (A) Converts light energy into electricity
 - (B) Converts electricity into light energy
 - (C) Stores Light energy
 - (D) Stores Electricity
2. The force per unit charge is known as _____.
 - (A) Electric current
 - (B) Electric potential
 - (C) Electric field
 - (D) Electric space
3. The quantization of charge indicates that
 - (A) Charge, which is a fraction of charge on an electron, is not possible
 - (B) A charge cannot be destroyed
 - (C) Charge exists on particles
 - (D) There exists a minimum permissible charge on a particle
4. The property which differentiates two kinds of charges is called _____.
 - (A) Equality of charge
 - (B) Polarity of charge
 - (C) Fraction of charge
 - (D) None of the option
5. What is the order of magnitude of the resistance of a dry human body?
 - (A) $10\ \Omega$
 - (B) $10^4\ \Omega$
 - (C) $10\ M\Omega$
 - (D) $10\ \mu\Omega$
6. Which of the following is non-ohmic resistance?
 - (A) Lamp filament
 - (B) Copper wire
 - (C) Carbon resistor
 - (D) Diode
7. Unit of conductance is _____.
 - (A) Dyne
 - (B) Siemen
 - (C) Ohm
 - (D) Volts
8. Current density is a _____.
 - (A) scalar quantity
 - (B) vector quantity
 - (C) dimensionless quantity
 - (D) none of these
9. The resistivity of certain metals or alloys drops to zero when they are cooled below a certain temperature, this phenomenon is known as _____.
 - (A) Conductivity
 - (B) Partial conductivity
 - (C) Superconductivity
 - (D) Non-conductivity
10. The opposition offered by the electrolyte of the cell to the flow of current through itself is known as _____.
 - (A) External resistance
 - (B) Internal resistance
 - (C) Non-resistance
 - (D) None of these
11. SI unit of the magnetic field is _____.
 - (A) Dyne
 - (B) Ohm
 - (C) Tesla
 - (D) Volt

12. When the charged particles move in a combined magnetic and electric field, then the force acting is known as _____.
 (A) Centripetal force (B) Centrifugal force
 (C) Lorentz force (D) Orbital force
13. Magnetic field at any point inside the straight solenoid is given as _____.
 (A) $B = \mu_0 n I$ (B) $B = \mu_0 + n I$ (C) $B = \mu_0 / n I$ (D) $B = \mu_0 n I$
14. Cyclotron is a device used to _____.
 (A) Slow down charged particles
 (B) Accelerate the positively charged particles
 (C) Stop the charged particles
 (D) None of these
15. Gauss =
 (A) 10^4 Tesla (B) 10^{-4} Tesla (C) 10^2 Tesla (D) 10^{-2} Tesla
16. State **true** or **false**: A cyclotron is a device used to accelerate uncharged particles like neutrons.
 (A) True (B) False
17. Lorentz force is given by the formula
 (A) $F = q(v + B + E)$ (B) $F = q(v - B - E)$
 (C) $F = q(v * B * E)$ (D) $F = q(v * B + E)$
18. The concept of displacement current was introduced by _____.
 (A) Newton (B) Ampere (C) Maxwell (D) Fleming
19. A freely suspended magnet aligns in which direction?
 (A) South-west (B) East-west (C) North-south (D) North-west
20. Which among the following materials display higher magnetic susceptibility?
 (A) Ferromagnetic material (B) Paramagnetic material
 (C) Diamagnetic material (D) None of these
21. A permanent magnet has the capacity to attract
 (A) All substances (B) Some substances
 (C) Only ferromagnetic substances (D) None of these
22. The SI unit of magnetic flux is
 (A) Dyne (B) Tesla (C) Weber (D) Ohm
23. What is the main function of a transistor?
 (A) Simplify (B) Amplify (C) Rectify (D) All of these
24. In a semiconductor, what is responsible for conduction?

- (A) Electrons only (B) Holes only
(C) Both electrons and holes (D) Neither electrons nor holes
25. What happens to the resistance of semiconductors on heating?
(A) Increases (B) Decreases
(C) Remains the same (D) First increases later decrease
26. In intrinsic semiconductors at room temperature, the number of electrons and holes are
(A) Unequal (B) Equal (C) Infinite (D) Zero
27. Which of the following is not a universal gate?
(A) NOT (B) AND (C) OR (D) NAND
28. Which of the following states that an emf is induced whenever there is a change in the magnetic field linked with electric circuits?
(A) Lenz's Law
(B) Ohm's Law
(C) Faraday's Law of Electromagnetic Induction
(D) None of the above
29. Which of the following gives the polarity of the induced emf?
(A) Biot-Savart Law (B) Lenz's Law
(C) Ampere's circuital Law (D) Fleming's right-hand Rule
30. Electrical Inertia is the measure of
(A) Self Inductance (B) Mutual Inductance
(C) Impedance (D) None of these
31. Which of the following laws is the consequence of the Law of conservation of energy?
(A) Lenz's Law (B) Ohm's Law (C) Archimedes Law (D) All of these
32. Which of the following apparatus construction uses electromagnetic induction?
(A) Voltmeter (B) Galvanometer (C) Generator (D) Electric Motor
33. Which of the following factors is the self inductance associated with a coil is independent of?
(A) induced voltage (B) current (C) time (D) coil resistance
34. Which of the following rules is used to identify the direction of the current induced in a wire moving in a magnetic field?
(A) Ampere's Rule (B) Fleming's Left-Hand Rule
(C) Fleming's Right-Hand Rule (D) None of these
35. Television signals are
(A) Amplitude modulated (B) Frequency modulated
(C) Phase modulated (D) Both frequency and amplitude modulated

36. What happens when the radio wave reaches the ionizing medium?
 (A) Will bend towards normal (B) Will bend away from the normal
 (C) Will follow a straight path (D) None of these
37. What is the frequency of the AC Mains in India?
 (A) 60 Hz (B) 50 Hz (C) 40 Hz (D) 30 Hz
38. An alternating current can be produced by
 (A) Choke Coil (B) Dynamo (C) Electric Motor (D) Transformer
39. Which of the following can measure an alternating current?
 (A) Voltmeter (B) Ammeter
 (C) Suspended coil galvanometer (D) Moving coil galvanometer
40. Which of the following circuits exhibits maximum power dissipation?
 (A) Pure Inductive Circuit (B) Pure Capacitive Circuit
 (C) Pure Resistive Circuit (D) None of these
41. What happens to the inductive reactance when the frequency of the AC supply is increased?
 (A) Increases (B) Decreases
 (C) Remains the same (D) Decreases inversely
42. What happens to the quality factor of an LCR circuit if the resistance is increased?
 (A) Increases (B) Decreases
 (C) Remains the same (D) None of these
43. Which of the following statements is true about the LCR circuit connected to an AC source at resonance?
 (A) Voltage across R equals the applied voltage
 (B) Voltage across R is zero
 (C) Voltage across C is zero
 (D) Voltage across L equals the applied voltage
44. The impedance in the series LCR circuit is minimum at the resonance frequency.
 (A) True (B) False
45. When is the current in a circuit wattless?
 (A) When the inductance of the circuit is zero
 (B) When the resistance of the circuit is zero
 (C) When the current is alternating
 (D) When both resistance and inductance are zero
46. The power factor is one for which of the following?
 (A) Pure capacitor (B) Pure inductor

- (C) Pure resistor (D) All of these
47. What purpose does the transducer serve?
- (A) It converts sound signal to electrical signal
 (B) It converts the electrical signal to a sound signal
 (C) It converts electrical signals to magnetic form
 (D) It converts sound signal to magnetic signal
48. Which of the following waves have a maximum frequency?
- (A) infrared waves (B) gamma rays (C) microwaves (D) radio waves
49. According to Maxwell's Hypothesis, a changing electric field gives rise to?
- (A) Induced EMF (B) Electric Field (C) Magnetic Field (D) Magnetic Dipole
50. Which of the following proves that electromagnetic waves are transverse?
- (A) Reflection (B) Diffraction (C) Interference (D) Polarisation
51. Which of the following is used to investigate the structure of solids?
- (A) Gamma Rays (B) Infrared Rays (C) X-Rays (D) Cosmic Rays
52. Which of the following radiations are used to treat muscle ache?
- (A) Microwaves (B) Infrared Rays (C) Ultraviolet Rays (D) X-Rays
53. When is the conduction current the same as the displacement current?
- (A) When the source is ac (B) When the source is dc
 (C) When the source is either an ac or a dc (D) When the source is neither dc nor ac
54. A p-type semiconductor is
- (A) Positively charged (B) Negatively charged
 (C) Uncharged (D) None of these
55. Which waves are used by artificial satellites for communication?
- (A) Infrared rays (B) Microwaves (C) Radiowaves (D) X-Rays
56. In a p-type semiconductor, the current conduction is due to
- (A) Holes (B) Atoms (C) Electrons (D) Protons
57. Which of the following lights deviates the most when it passes through a prism?
- (A) Red Light (B) Violet Light
 (C) Neither (A) nor (B) (D) Both (A) and (B)
58. Which of the following phenomena of light results in a mirage?
- (A) Refraction of light (B) Reflection of light
 (C) Total internal reflection (D) Diffraction of light
59. For which of the following is the field of view maximum?

- (A) Concave mirror (B) Convex mirror
(C) Plane mirror (D) Cylindrical mirror
60. What happens when the light is refracted into a medium?
(A) Both frequency and wavelength of the light increase
(B) The wavelength increases but the frequency remains unchanged
(C) Both wavelength and frequency decrease
(D) The wavelength decreases but the frequency remains constant
61. If a glass prism is dipped in water, what happens to its dispersive power?
(A) Increases (B) Decreases (C) Does not change (D) No effect
62. What should be increased to increase the angular magnification of a simple microscope?
(A) The power of the lens (B) The focal length of the lens
(C) Lens Aperture (D) Object Size
63. Which of the following phenomenon is used in optical fibre?
(A) Refraction (B) Diffraction
(C) Scattering (D) Total Internal Reflection
64. Which of the following statements is true for total internal reflection?
(A) Light travels from rarer medium to denser medium
(B) Light travels from denser medium to rarer medium
(C) Light travels in water only
(D) Light travels in the air only
65. Which of the following are not emitted by radioactive substances?
(A) Protons (B) Electrons (C) Gamma Rays (D) Helium Nuclei
66. For a telescope, the larger the diameter of the objective lens
(A) Greater the resolving power (B) Greater the magnifying power
(C) Smaller the resolving power (D) Smaller the magnifying power
67. Which of the following factors does the intensity of light depend on?
(A) Frequency (B) Wavelength (C) Amplitude (D) Velocity
68. Which of the following light phenomena confirms the transverse nature of light?
(A) Refraction of light (B) Diffraction of light
(C) Dispersion of light (D) Polarization of light
69. Polaroid glasses are used in sunglasses because
(A) They are cheaper
(B) They have a good colour
(C) They look fashionable

- (D) They reduce the light intensity to half on account of polarization
70. Two light sources are said to be coherent when both the sources of light emit light of
- (A) The same amplitude and phase
 - (B) The same intensity and wavelength
 - (C) The same speed
 - (D) The same wavelength and constant phase difference
71. Isotones have the same number of
- (A) Protons
 - (B) Electrons
 - (C) Neutrons
 - (D) All of these
72. What bonds are present in a semiconductor?
- (A) Monovalent
 - (B) Bivalent
 - (C) Trivalent
 - (D) Covalent
73. The number of electrons in the valence shell of a semiconductor is
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
74. The emission of electrons does not occur in which of the following?
- (A) Photoelectric Emission
 - (B) Thermionic Emission
 - (C) Secondary Emission
 - (D) X-Ray Emission
75. What happens to the kinetic energy of the emitted electrons when the light is incident on a metal surface?
- (A) It varies with the frequency of light
 - (B) It varies with the light intensity
 - (C) It varies with the speed of light
 - (D) It varies irregularly