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FOR MAHA SET PREPARATION

MAHA SET 2023 Paper II Life Sciences Set A Question Paper

EXAM	YEAR	TYPE
MAHA SET	2023	Question Paper

Test Booklet Code & Serial No.
प्रश्नपत्रिका कोड व क्रमांक

A

Paper-II
LIFE SCIENCE

Signature and Name of Invigilator

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | | |

(In figures as in Admit Card)

Seat No. .....

(In words)

OMR Sheet No. | | | | | | | |

(To be filled by the Candidate)

MAR - 34223

Time Allowed : 2 Hours] **[Maximum Marks : 200**

Number of Pages in this Booklet : **20** Number of Questions in this Booklet : **100**

Instructions for the Candidates

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. This paper consists of **100** objective type questions. Each question will carry *two* marks. *All* questions of Paper II will be compulsory.
3. At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
   (*i*) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal or open booklet.
   (*ii*) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to missing pages/questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.
   (*iii*) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each question has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example : where (C) is the correct response.
   (A) (B) ● (D)
5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only.** If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done at the end of this booklet.
8. If you write your Name, Seat Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
9. You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table, etc., is prohibited.
12. There is no negative marking for incorrect answers.

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

1. परीक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत 100 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनिटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्वीकारू नये.
   (*ii*) पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चुकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.
   (*iii*) वरीलप्रमाणे सर्व पडताळून पाहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
   उदा. : जर (C) हे योग्य उत्तर असेल तर.
   (A) (B) ● (D)
5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणाव्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गांचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापि, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.
11. कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.
12. चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.

MAR - 34223/II—A

2

MAR - 34223/II—A

Life Science
Paper II

Time Allowed : 120 Minutes] **[Maximum Marks : 200**

Note : This Paper contains **Hundred (100)** multiple choice questions. Each question carrying **Two (2)** marks. Attempt *All* questions.

1. Phages are collected from an infected *E.coli* donor strain of genotype ser^+, gly^+, leu^+ and used to transduce a recipient of genotype ser^-, gly^-, leu^-. The treated recipient population is plated on a minimal medium supplemented with leucine and serine. Many colonies grew. Which one of the following combination of genotypes is appropriate for the colonies that grew ?

   (A) ser^-, gly^-, leu^+; ser^+, gly^-, leu^+; ser^+, gly^-, leu^-

   (B) ser^+, gly^+, leu^+; ser^+, gly^-, leu^+; ser^+, gly^-, leu^-

   (C) ser^-, gly^+, leu^+; ser^+, gly^+, leu^+; ser^+, gly^+, leu^-

   (D) ser^-, gly^+, leu^+; ser^+, gly^-, leu^+; ser^+, gly^-, leu^-

2. Mark the most INCORRECT statement with respect to mammalian below :

   (A) Very small quantity of oxygen is transported as dissolved in plasma

   (B) Least amount of carbon dioxide is transported as dissolved in plasma

   (C) Increased carbon dioxide in blood favours release of oxygen from hemoglobin

   (D) Maximum carbon dioxide is transported as bound to hemoglobin

3. The following are certain statements regarding secondary metabolites found in plants. Among the following, which is FALSE ?

   (A) Alkaloids are nitrogen containing compounds

   (B) All terpenes are derived from five carbon isoprene units

   (C) Flavanoids contain 15 carbons arranged in two aromatic rings connected by a 3 carbon bridge

   (D) Phenylalanine is an intermediate in the biosynthesis of most plant alkaloids

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4. In the absence of oxygen, the metabolic fate of pyruvic acid will be :

(A) Its partial oxidation will take place

(B) Its complete oxidation will take place

(C) It will be utilized for reoxidation of NADH

(D) It will be utilized depending on energy need

5. Which of the following statement for Gibberellins is NOT CORRECT ?

(A) Gibberellins regulate transition from juvenile to adult phases

(B) Gibberellins promote seed germination

(C) Gibberellins can regulate cell cycle

(D) Gibberellins are synthesized via the terpenoid pathway

6. During which of the following stages of meiosis, does the synaptonemal complex breakdown leading to the separation of two homologous chromosomes ?

(A) Zygotene

(B) Pachytene

(C) Diplotene

(D) Diakinesis

7. Which of the following statements about embryo sac development in plants is NOT CORRECT ?

(A) Embryo sac is mostly a 7-celled structure

(B) Plumbago type of embryo sac is derived from four megaspore nuclei

(C) Synergids are elongated cells present at the micropylar end of the embryo sac

(D) Polygonum type of embryo sac is derived from the micropylar megaspore of the tetrad and is eight nucleate

8. In chick, gastrulation involves inward movement of cells through the :

(A) Blastoderm

(B) Yolk

(C) Cleavage furrow

(D) Primitive streak

9. Heart muscles normally cannot be tetanized because :

(A) It receives O_2 directly from the blood it pumps

(B) Its absolute refractory period is long

(C) It does not contain more Ca^{2+}

(D) It does not possess Ca^{2+} channels

10. In which of the following evolutionary processes random changes in allele frequency can lead to loss of genetic diversity ?

(A) Recombinant event

(B) Gene flow

(C) Genetic drift

(D) Spontaneous selection

11. Match the antibiotics in Column A with their appropriate antimicrobial activity from Column B :

Column A

I. Gatifloxacin

II. Acyclovir

III. Mefloquine

IV. Griseofulvin

Column B

(*a*) Antifungal agent

(*b*) Antibacterial agent

(*c*) Antiviral agent

(*d*) Antiprotozoal agent

	I	II	III	IV
(A)	(*b*)	(*a*)	(*d*)	(*c*)
(B)	(*b*)	(*c*)	(*d*)	(*a*)
(C)	(*d*)	(*c*)	(*a*)	(*b*)
(D)	(*b*)	(*d*)	(*c*)	(*a*)

12. In the prokaryotic protein synthesis, initiation site of *m*RNA consists of.....codon preceeded by .....

(A) AUG, Shine-Dalgamo poly-purine hexamer

(B) GUG, 5'-Cap

(C) UAG', m7G

(D) AGG', Methylated guanosine

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13. Which of the following sigma subunit of prokaryotic RNA Polymerase is responsible for transcription of housekeeping genes ?
    (A) Sigma 32
    (B) Sigma 54
    (C) Sigma 70
    (D) Sigma 28

14. Arabidopsis AtNHX1 gene encodes a tonoplast Na^+/H^+ antiporter used to develop transgenic plants to improve :
    (A) drought tolerance
    (B) salinity tolerance
    (C) pest resistance
    (D) pathogen resistance

15. Which one is NOT an agglutination test ?
    (A) Widal test
    (B) Coombs test
    (C) Mantoux test
    (D) Blood group test

16. Which of the following statements about phytochrome is NOT CORRECT ?
    (A) Phytochrome contains PAS, GAF, PHY and PRD domains
    (B) Phytochrome is a light regulated protein kinase
    (C) Phytochrome are encoded by a multigene family
    (D) Phytochrome are normally found in the chloroplast

17. In which of the following the hydrogen bond is NOT formed ?
    (A) between water and amino group of an amino acid
    (B) between carbonyl group of protein and amino group of protein
    (C) between hydroxy group of alcohol and water
    (D) between methyl group of alanine and water

18. Heritability estimates the proportion of :
    (A) genetic variation in a group that can be attributed to phenotype
    (B) Phenotypic variation in an individual that can be attributed to genes
    (C) Phenotypic variation in a group that can be attributed to genes
    (D) Environmental variation in a group that can be attributed to phenotype

19. Classically, prions are recognized as agent causing :

(A) Schizophrenia

(B) Cerebral stroke

(C) Alzheimer's disease

(D) Madcow disease

20. Which of the following statements about crossing over is true ?

(A) There is a greater probability for a crossover to occur between 2 genes farther apart from the genes nearer to each other

(B) There is a lesser probability for a crossover to occur between 2 genes farther apart from the genes nearer to each other

(C) Probability of crossover between 2 genes is inversely proportional to the distance between them

(D) Maximum frequency of recombination that can result from crossing over between linked genes is 100%

21. Name the mechanism by which new alleles appears in a population.

(A) Karyokinesis

(B) Mutation

(C) Heredity

(D) Cytokinesis

22. I : Acetylation and deacetylation of chromatin is associated with masking and unmasking of chromatin for transcription.

II : The activity of HAT and HDAC is associated with condensing and relaxing the chromatin.

Select the *correct* answer :

(A) I only is correct

(B) II only is correct

(C) I is correct and II is wrong

(D) II is correct and I is wrong

23. Patch clamp technique is used in biological membrane studies. What is it mainly used to detect ? Select the *correct* option.

(A) To estimate ion flow through ion channels

(B) To quantify membrane proteins

(C) To estimate membrane lipids in outer leaflet

(D) To prove lateral diffusion of lipids in the membrane

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24. During in vitro DNA synthesis which of the following radionucleotide is most preferred ?

(A) ^{3}H labelled dTTP

(B) ^{14}C labelled dUTP

(C) γ-^{32}P labelled dTTP

(D) β-^{32}P labelled dTTP

25. The nucleotides from the 5'end of the bacterial *t*RNA precursor are cleaved during the maturation process. Which enzyme is involved in this process ?

(A) RNase P

(B) RNase Z

(C) *t*-RNA nucleotidyl transferase

(D) S_1 nuclease

26. Which one of the following is *not* a DNA depurinating agent ?

(A) Ethyl ethane sulphonate

(B) Nitroso guanidine

(C) Dimethyl nitrosamine

(D) Methyl ethane sulphonate

27. Anatomically the conversion of series heart to parallel heart with separation of oxygenated and deoxygenated blood circulation observed as primary feature in the following evolutionary sequence in chordate evolution :

(A) Agnatha to Fishes

(B) Fishes to Amphibia

(C) Amphibia to Reptiles

(D) Birds to Mammals

28. Downy mildew is the most destructive fungal disease of grapevines and is caused by :

(A) *Plasmopara viticola*

(B) *Ascochyta rabiei*

(C) *Puccinia striiformis*

(D) *Sclerospora graminicola*

29. Presence of parasite on the surface of the body of host is called as :

(A) Infestation

(B) Infection

(C) Pollution

(D) Contamination

30. In which one of the following phenomena, coding region of the gene is affected, hence new protein is formed ?

(A) Heterotopy

(B) Heterotypy

(C) Heterochrony

(D) Heterometry

31. Out of the following Helminthes which one of the groups is solitary and free living representatives ?

(A) Turbellaria

(B) Trematoda

(C) Cestoda

(D) Nematoda

32. The gill like structure that is non-respiratory in function in the branchial chamber of some of the teleosts is known as :

(A) Suprabranch

(B) Holobranch

(C) Hemibranch

(D) Pseudobranch

33. The *t*-RNA is specific for an amino acid and it differs in sequence of nucleotides. All *t*-RNA molecules contain a base paired stem that terminates in the CCA sequence at :

(A) 3' termini

(B) 5' termini

(C) anticodon arm

(D) spacer arm

34. In Larval amphibians, which of the following neuropeptides controls the release of thyroid stimulating hormone (TSH) that in turn regulates metamorphosis by stimulating the secretion of T_3 & T_4.

(A) Thyrotropin releasing hormones (TRH)

(B) Gonadotropin releasing hormone (GnRH)

(C) Corticotropin releasing hormone (CRH)

(D) Growth hormone releasing hormone (GHRH)

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35. DNA is NOT present in which one of the following ?

(A) Bacteriophage T4

(B) Tobacco Mosaic Virus (TMV)

(C) Adenovirus

(D) Chloroplast

36. Proof reading activity of DNA Polymerase is :

(A) 3' $\rightarrow$ 5' exonuclease activity

(B) 5' $\rightarrow$ 3' exonuclease activity

(C) Endonuclease activity

(D) 5' $\rightarrow$ 3' polymerase activity

37. The deamination of adenine leads to formation of :

(A) Cytosine

(B) Hypoxanthine

(C) Xanthine

(D) Uracil

38. In enzyme kinetics the rate constant K_{cat} refers to :

(A) Michaelis-Menten Constant

(B) Substrate concentration at V_{max}

(C) Turn over number

(D) Total number of active sites on the enzyme

39. What is the pI value of a non-standard amino acid X, whose pK_1, pK_2 and pK_3 values are 2.5, 7.5 and 9.0 ?

(A) 8.25 (B) 5.0

(C) 5.75 (D) 6.33

40. The diploid maize ($2n$ = 2X = 20) treated with colchicine to induce tetraploidy. However, it showed sterility because :

(A) Problems in mitosis

(B) Induced male sterility

(C) Problems in meiosis

(D) Induced self-incompatibility

41. How do viruses gain entry to a host cell ?

(A) By dissolving a piece of the host cell membrane

(B) By binding to an antibody site on the host cells

(C) By diffusion through the cell membrane

(D) By binding to a receptor site on the host cell

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42. The primary mode of transmission for spread of polio virus is :
(A) Ingestion (Oral-fecal)
(B) Respiratory droplets
(C) Sexual transmission
(D) Blood transfusion

43. The process of using bacteria for extraction of valuable metals in mining industry is known as :
(A) Biodegradation
(B) Bioleaching
(C) Biosorption
(D) Bioremediation

44. The only poisonous lizard found in South America is :
(A) Calotes
(B) Hemidactylus
(C) Heloderma
(D) Mabuya

45. Which of the following is *not* a developmental stage in the life cycle of *Fasciola hepatica* ?
(A) Cercaria
(B) Cystecircus
(C) Metacercaria
(D) Sporocysts

46. In an ecosystem.....requires maximum energy.
(A) Primary producer
(B) Primary consumer
(C) Secondary consumer
(D) Decomposer

47. Which one of the following 'biomes' does not have fauna & flora characteristic of tropical rain forests ?
(A) South America
(B) South Central Africa
(C) Central Africa
(D) Australia

48. In a pond ecosystem, the bottom area where production is less than respiration is called as :
(A) Limnetic zone
(B) Benthic zone
(C) Profundal zone
(D) Intertidal zone

49. "Each creature on earth was separately created" is :
(A) a belief and does not fall within the scope of experimental science
(B) best described as a natural law
(C) a testable hypothesis
(D) a theory

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50. RUBISCO is encoded by :
    (A) Mitochondrial DNA
    (B) Plastid DNA and mitochondrial DNA
    (C) Mitochondrial DNA and Chloroplast DNA
    (D) Nuclear DNA and Chloroplast DNA

51. The following are the characteristics of *k*-selected animals except :
    (A) Energy spent per offspring is high
    (B) A few offsprings are produced that mature late and live longer
    (C) Type-II survivorship pattern is observed
    (D) Semelparous

52. Darwin's finches, which have adapted to different Galapaqos islands have different bill sizes, shapes colouration and body size. This is an example of :
    (A) Homology
    (B) Convergence
    (C) Parallelism
    (D) Adaptive radiation

53. Which of the following fossil organs DOES NOT belong to pentoxylon plant ?
    (A) Nipaniophyllum
    (B) Sahnia
    (C) Carnoconites
    (D) Williamsonia

54. Which type of interaction that involves an individual sacrificing some of its own reproductive success for the benefit of the other ?
    (A) Co-operation
    (B) Mutualism
    (C) Commensalism
    (D) Altruism

55. Many species of bony fishes swim together in a coordinated fashion, called schooling.
    Which one of the following is *not* true for the advantages of schooling ?
    (A) Avoiding predators
    (B) Locating food sources
    (C) Increases reproductive success
    (D) Attainment of faster growth

56. For developing transgenic mustard variety DMH-11 Bar, Barnase and Barstar genes were obtained from :

(A) *Bacillus amyloliquefaciens*

(B) *Bacillus thuringiensis*

(C) *Agrobacterium tumefaciens*

(D) *Erwinia uredovora*

57. Nowadays blood glucose is measured by glucometer, where the glucose is measured by :

(A) rate of disappearance of substrate

(B) rate of appearance of product

(C) rate of electron flow from glucose to an electrode surface

(D) rate of electron flow from electron donor to glucose

58. Match the following products with their method of production :

Column A

I. Beer

II. Wine

III. Vinegar

IV. Spirit

Column B

(*a*) Fermentation of grape juice with yeast

(*b*) Fermentation of malted grain and yeast

(*c*) Fermentation followed by distillation of ethanol

(*d*) Fermentation to produce ethanol followed by *Acetobacter* metabolism of ethanol

Codes :

	I	II	III	IV
(A)	(*b*)	(*a*)	(*d*)	(*c*)
(B)	(*c*)	(*a*)	(*d*)	(*b*)
(C)	(*c*)	(*b*)	(*a*)	(*d*)
(D)	(*a*)	(*d*)	(*b*)	(*c*)

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59. Which phytoremediation approach involves reduced mobility of contaminants through sorption onto plant root surfaces ?
(A) Phytostabilization
(B) Rhizofiltration
(C) Phytovolatilization
(D) Rhizodegradation

60. Blue white screening is done to :
(A) Check expression of cloned gene
(B) Check the presence of a cloned insert in a plasmid
(C) Check the presence of a plasmid in bacteria
(D) Check the copy number of cloned insert in a plasmid

61. A vector is designed to replicate in both, *E.coli* and Streptomyces. It is reconstructed from *E.coli* plasmid and streptomyces plasmid. What is the type of such vectors ?
(A) Phagemid vectors
(B) Shuttle vectors
(C) BAC vectors
(D) YAC vectors

62. For insertion of DNA into a suitable vector several methods are used and homopolymer tailing is one of them. Which specific enzyme is used in this method to synthesize homopolymer tail ?
(A) T_4 DNA ligase
(B) Polynucleotide kinase
(C) Terminal deoxynucleotidyl transferase
(D) S_1 nuclease

63. Which region of CD spectrum gives details of secondary structure of a protein ?
(A) Far–UV region
(B) Near–UV region
(C) Entire–UV region
(D) Both UV and Visible region

64. In RIA; radiolabelling is done for :
(A) Antigen
(B) Antibody
(C) Antigen antibody complex
(D) Secondary antibody

65. For which distribution mean and variance are equal ?
(A) Binomial distribution
(B) Chi-square distribution
(C) Poisson distribution
(D) Normal distribution

66. One of the following zones of electromagnetic spectrum is used for passive optical remote sensing :
(A) X-Ray
(B) Visible band
(C) Microwave
(D) Radiowave

67. The heat shock response in *E.coli* increases the level of a regulator molecule that binds to promoter for RNA polymerase to increase the production of heat shock protein :
(A) $_{ppp}G_{ppp}$
(B) σ^H/σ^{32} factor
(C) AppppA
(D) Diadeosine-3'

68. Which of the following protein inhibits kinase activity of yeast CDK by phosphorylation during G2 checkpoint ?
(A) Wee 1
(B) CDC 25
(C) CDC 20
(D) RB (Retinoblastoma)

69. Genome size refers to the amount of DNA contained in a :
(A) Haploid genome
(B) Diploid genome
(C) Haploid as well as diploid genome
(D) Complete organism

70. Why *Dinococcus radiodurans* is able to survive massive exposure to radiation ?
(A) It produces a thick shell which acts as a shield against radiation
(B) It has unique DNA repair mechanism
(C) Its cell secrete slime
(D) It has many copies of genes encoding for DNA repair

71. How bacterial cells transport oxygen and water across the cell membrane ?
(A) Group translocation
(B) Active transport
(C) Facilitated diffusion
(D) Simple passive diffusion

72. Which of the following component from *Halobacterium salinarum* absorb the energy in sunlight and generates proton motive force (pmf) through phocycling under anaerobic or microaerobic conditions ?
(A) Chlorosomes
(B) Bacteriochlorophylla
(C) Bacteriorhodopsin
(D) Photosystem-I

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73. One of the signalling molecules used for bacterial cell-cell communication are :
(A) N-acetyl hydroxy laccase
(B) N-acyl homoserine laccase
(C) N-acetyl homoserine lactone
(D) N-acyl homoserine lactone

74. The embryonic origin of squamous cell carcinoma is :
(A) Endoderm
(B) Mesoderm
(C) Mesenchymal tissue
(D) Ectoderm

75. The kidney transplantation from one individual to another is a :
(A) Isograft
(B) Allograft
(C) Autograft
(D) Xenograft

76. When you are continuously exposed to specific antigen for a longer period which of the following statements falls *wrong* ?
(A) There will be antibody class switching happening in the body
(B) There will be affinity maturation happening in the body
(C) The body produces same antibody always
(D) There will be primary and secondary response happening

77. Diffusion, formation of stable concentration gradient and functioning of hedgehog proteins critically depend on their association with :
(A) Fatty acids
(B) Cholesterol
(C) Lenolenic acid
(D) Carboxylic acid

78. The visceral arches IV to VII of basic vertebrate body plan gave rise to one of the following systems during their evolution :
(A) Digestive system
(B) Respiratory system
(C) Excretory system
(D) Nervous system

79. Widely used molecular characterisation technique for identification of different strains of bacteria is :
(A) Serological identification analysis
(B) 5S ribosomal RNA genes analysis
(C) 16S ribosomal RNA genes analysis
(D) Total *m*RNA genes analysis

80. Translocation in philadelphia chromosome :
(A) 19 to 21 chromosome region exchange
(B) 9 to 21 chromosome region exchange
(C) leads to the production of black urine
(D) leads to the chronic myelogenous leukemia

81. Paradox related to protein folding is :
(A) C. Value paradox
(B) Sherman paradox
(C) Lombard's paradox
(D) Levinthal's paradox

82. Glucose 6 phosphate and glyceraldehyde 3 phosphate are processed by glycolysis. How many ATP molecules will be generated respectively from each ?
(A) 2 ATP and 3 ATP
(B) 3 ATP and 3 ATP
(C) 3 ATP and 2 ATP
(D) 4 ATP and 2 ATP

83. How many ATP molecules are formed when sucrose is metabolized during glycolysis by substrate level phosphorylation ?
(A) 2 (B) 4
(C) 8 (D) 00

84. The vitamin which plays an important role in conversion of proline to hydroxyproline in building the appropriate collagen protein is :
(A) Vitamin A
(B) Vitamin B
(C) Vitamin C
(D) Vitamin D

85. In Eukaryotes, the promoter sequence TATA box is located at :
(A) 10 to 15 base pairs upstream of transcription site
(B) 10 to 15 base pairs downstream of transcription site
(C) 25 to 35 upstream of transcription site
(D) 25 to 35 downstream of transcription site

86. Which one is NOT true in case of CpG ?
(A) CpG are island promoters
(B) CpG are involved in gene regulation at chromatin level
(C) CpG within promoters are methylated
(D) Methylation in CpG is associated with 'C'.

87. Ubiquitin ligases are associated with degradation of :
(A) Protein
(B) DNA
(C) RNA
(D) Carbohydrates

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88. Which one of the following is *not* readily absorbed in the small intestine ?
(A) Na^+ (B) Cl^-
(C) K^+ (D) Mg^{++}

89. The menstrual cycle of human female is the example of biorhythm known as :
(A) Ultradian rhythm
(B) Tidal rhythm
(C) Infradian rhythm
(D) Circadian rhythm

90. Which of the following heat shock proteins is present in almost every compartment of the Eukaryotic cell ?
(A) Hsp60 (B) Hsp70
(C) Hsp90 (D) Hsp100

91. Muscle overactivity like long running needs more O_2 to the muscles. This is achieved by release of more O_2 from the blood hemoglobin due to :
(A) more blood flows to the muscles
(B) accummulation of lactic acid and increasing pH
(C) accummulation of lactic acid and reducing pH
(D) Increased demand of O_2 by the muscles

92. Given the abbreviations, which of the following equations describe best the glomerular filtration rate (GFR) ?
K_f – glomerular capillary filtration coefficient
P_g – glomerular hydrostatic pressure
P_b – hydrostatic pressure of Bowmen's capsule
G_c – Osmotic pressure of plasma proteins in the glomerular capillary
B_c – Osmotic pressure of proteins in Bowmen's capsule
(A) $GFR = K_f \times (P_g – P_b – G_c + B_c)$
(B) $GFR = K_f + (P_g + P_b + G_c + B_c)$
(C) $GFR = K_f – (P_g – P_b + G_c – B_c)$
(D) $GFR = K_f \times (P_g + P_b – G_c – B_c)$

93. Name the water soluble non-B complex vitamin that is structurally similar to a monosaccharide :
(A) Pantothenic acid
(B) Biotin
(C) Niacin
(D) Ascorbic acid

94. The amino acid involved as a precursor in auxin biosynthesis is :
(A) Serine (B) Tryptophan
(C) Valine (D) Tyrosine

95. In aerobic respiration, oxidation of 1 molecule of glucose gives rise to how many ATPs ?
(A) 10 (B) 25
(C) 30 (D) 36

96. For the synthesis of one molecule of glucose through Calvin cycle ..... are required.
(A) 6 CO + 30 ATP + 12 NADPH
(B) 6 CO + 12 ATP
(C) 6 CO + 18 ATP + 12 NADPH
(D) 6 CO + 18 ATP + 16 NADPH

97. The folding of sheet of cells, the migration of cells and apoptosis are all mechanisms of :
(A) cleavage pattern
(B) pattern formation
(C) morphogenesis
(D) differentiation

98. In Drosophila, the fate of early blastomeres is determined through :
(A) Autonomous specification
(B) Conductional specification
(C) Syncytial specification
(D) Maternal specification

99. How does P^{53} prevent the unrestrained proliferation cells leading to cancer ?
(A) By preventing the proliferation of cells with damaged DNA
(B) By acting as a transcription factor
(C) By stimulating the synthesis of DNA repair enzymes which replace telomeres
(D) By preventing cells from triggering apoptosis

100. Match the *correct* combination between A and B :

(A)

(1) Prokaryotic cells
(2) Eukaryotic cells
(3) Eukaryotic cells
(4) Prokaryotic cells

(B)

(*i*) more than 10 micrometers and lack membrane surrounding every organells
(*ii*) more than 10 micrometers and lack membrane around some organelles
(*iii*) less than 10 micrometers and possess membrane around some organelles
(*iv*) less than 5 micrometers and lack membrane around all organells

(A) 1 and (*ii*)
(B) 2 and (*i*)
(C) 3 and (*iii*)
(D) 4 and (*iv*)

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