MSc(HS)(Biophysics)

1. An angle whose value is ____, is called complete angle.
(A) 180^o (B) 240^o (C) 360^o (D) 85^o

2. The areas of two similar triangles are 81 sq. cm and 49 sq. cm. Find the ratio of their corresponding heights.
(A) 9:7 (B) 7:9 (C) 6:5 (D) 81:49

3. Consider ΔABD such that angle ADB = 20° and C is a point on BD such that AB=AC and CD=CA. Then the measure of angle ABC is
(A) 30° (B) 40° (C) 45° (D) 60°

4. A, B and C can complete a piece of work in 14, 6 and 12 days respectively. Working together, they will complete the work in
(A) 19/9 days (B) 27 days (C) 28/9 days (D) 25/8 days

5. The half life period of a first order reaction is 60 minutes. What percentage will be left over after 240 minutes?
(A) 6.25% (B) 4.25% (C) 5% (D) 6%

6. Which of the following is not a colligative property?
(A) Osmotic pressure (B) Optical activity
(C) Depression in freezing point (D) Elevation in boiling point

7. The amount of current in faraday is required for the reduction of 1 mol of $Cr_2O_7^{--}$ ions into Cr^{3+} is
(A) 1F (B) 2F (C) 6F (D) 4F

8. For a chemical reaction,
$mA \longrightarrow xB$, the rate law is $r=k[A]^2$
if the concentration of A is doubled, then the reaction rate will be
(A) Doubled (B) Quadrupled
(C) Increases by eight times (D) Unchanged

9. Schottky defect in a crystal is observed when,
(A)Unequal number of cations and anions are mission from the lattice
(B) Equal number of cations and anions are missing from the lattice
(C) An ion leaves its normal site and occupies an interstitial site
(D) No ion is missing from its lattice site

10. Replacement of Cl of chlorobenzene to give phenol requires drastic conditions, but Cl of 2,4 dinitro chlorobenzene is readily replaced. This is because,

(A) -NO_2 group makes the ring electron rich at ortho and para positions
(B) -NO_2 group withdraws electrons from meta position
(C) -NO_2 donates electrons at meta position
(D) -NO_2 withdraws electron from ortho and para positions

11. The number of oxygen atoms in 4.4gm of CO_2 is,
(A) $1.2x10^{23}$ (B) $6x10^{22}$ (C) $6x10^{23}$ (D) $12x10^{23}$

12. The correct statement regarding entropy is
(A) At absolute zero temperature, entropy of a perfectly crystalline solid is zero
(B) At absolute zero temperature, entropy of a perfectly crystalline substance is positive
(C) At absolute zero temperature, entropy of all crystalline solid is zero
(D) At 0^oC, the entropy of a perfectly crystalline solid is zero

13. "Tuberculosis" is caused by
(A) Bacterium (B) Virus (C) Protozoan (D) Malnutrition

14. The area of science that seeks to catalog and analyze every protein in the human body in order to help understand the human genome is called:
(A) Bioinformatics (B) Molecular genetics
(C) Proteomics (D) Genomics

15. β-radioactivity in a biological sample can be quantified by
(A) Liquid scintillation counting
(B) High-performance liquid chromatography (HPLC)
(C) Mass spectroscopy
(D) Colorimetry

16. 1 curie radioactivity is equal to
(A) 3.7×10^{10} dps (B) 3.7×10^{6} dps (C) 3.7×10^{1} dps (D) 3.7×10^{3} dps

17. In Electron microscope, light source is replaced by a beam of very fast moving
(A) Electron (B) Proton (C) Neutron (D) Photon

18. When no kinetic energy is lost, collision is said to be
(A) Inelastic (B) Perfectly elastic (C) Elastic (D) Both A and B

19. Platelets are formed from which type of cell?
(A) Melanocytes (B) Macrophages (C) Astrocytes (D) Megakaryocytes

20. A man grows into a giant such that his linear dimensions increase by a factor of 9. Assuming that his density remains same, the stress in the leg will change by a factor of:
(A) 9 (B) 1/9 (C) 81 (D) 1/81

21. A copper ball of mass 100 gm is at a temperature T. It is dropped in a copper calorimeter of mass 100 gm, filled with 170 gm of water at room temperature. Subsequently, the temperature of the system is found to be 75°C. T is given by: (Given: room temperature=30°C, specific heat of copper=0.1 cal/gm°C)

(A) 800°C (B) 885°C (C) 1250°C (D) 825°C

22. Cp and Cv are specific heats at constant pressure and constant volume respectively. It is observed that

Cp−Cv=a for hydrogen gas

Cp−Cv=b for nitrogen gas

The correct relation between a and b is:

(A) a=1/14*b (B) a=b (C) a=14b (D) a=28b

23. An observer is moving with half the speed of light towards a stationary microwave source emitting waves at frequency 10 GHz. What is the frequency of the microwave measured by the observer? (speed of light=3×10^8 ms^{-1})

(A) 10.1GHz (B) 12.1GHz (C) 17.3 GHz (D) 15.3GHz

24. A capacitance of 2 μF is required in an electrical circuit across a potential difference of 1.0 kV. A large number of 1 μF capacitors are available which can withstand a potential difference of not more than 300 V.

The minimum number of capacitors required to achieve this is:

(A) 2 (B) 16 (C) 24 (D) 32

25. When a current of 5 mA is passed through a galvanometer having a coil of resistance 15 Ω, it shows full scale deflection. The value of the resistance to be put in series with the galvanometer to convert it into a voltmeter of range 0−10 V is:

(A) 1.985×10^3 Ω (B) 2.045×10^3 Ω (C) 2.535×10^3 Ω (D) 4.005×10^3 Ω

26. In a common emitter amplifier circuit using an n-p-n transistor, the phase difference between the input and the output voltages will be:

(A) 45° (B) 90° (C) 135° (D) 180°

27. Which of the following statements is false?

(A) Wheatstone bridge is the most sensitive when all the four resistances are of the same order of magnitude.

(B) In a balanced wheat stone bridge if the cell and the galvanometer are exchanged, the null point is disturbed.

(C) A rheostat can be used as a potential divider.

(D) Kirchhoff's second law represents energy conservation.

28. What is the 94^{th} term of the following sequence?

1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,….

(A) 8 (B) 9 (C) 10 (D) 11

29. Which of the following numbers is a perfect square?

(A) 1022121 (B) 2042122 (C) 3063126 (D) 4083128

30. The equations m^2-33n+1=0, where m and n are integers, has
(A) No solution (B) Exactly one solutions
(C) Exactly two solutions (D) Infinitely many solutions

31. The sum of the first n natural numbers with one of them missed is 42. What is the number that was missed?
(A) 1 (B) 2 (C) 3 (D) 4

32. In a polysaccharide, number of monosaccharide are linked by
(A) Glycosidic bond (B) Peptide bond
(C) Hydrogen bond (D) Phosphoester bond

33. The Golgi Complex
(A) Synthesizes proteins
(B) Produces ATP
(C) Provides a pathway for transporting chemicals
(D) Forms glycoproteins

34. A person who has allergy, the type of antibody produced in his body is
(A) IgE (B) IgA (C) IgM (D) IgG

35. Patch clamp technique is used for
(A) Measuring action potential (B) Protein expression
(C) Single ion channel activity (D) DNA degradation

36. For the translocation of mRNA and tRNA within the ribosome
(A) ATP is required (B) AMP is required
(C) ADP is required (D) GTP is required

37. For a triclinic lattice type, the crystal parameters are
(A) a=b=c, α=β=γ=90° (B) a≠b=c, α≠β=γ=90°
(C) a≠b≠c, α≠β≠γ≠90° (D) a≠b≠c, α=β=γ=90°

38. Kupffer cells are found in which organ?
(A) Kidney (B) Lungs (C) Liver (D) Heart

39. Unstained living cells can be visualized by which microscopy?
(A) SEM (B) Confocal microscopy
(C) Flourescent Microscopy (D) Phase contrast microscopy

40. In prokaryotic cells the ribosome binds to the 5' end of the mRNA at a sequence known as a ribosome binding site which is also called as
(A) TATA box (B) CAT box
(C) Pribnow box (D) Shine–Dalgarno sequence

41. Electromagnetic radiation used to sterilize milk is

(A) Radiowaves (B) UV rays (C) Gamma - ray (D) X - ray

42. Which colour of the light has the longest wavelength?
(A) Red (B) Blue (C) Green (D) Violet

43. Increase in temperature of a gas filled in a container would lead to :
(A) Increase in its mass
(B) Increase in its kinetic energy
(C) Decrease in its pressure
(D) Decrease in intermolecular distance

44. Which of the following acts as a circuit protecting device?
(A) Conductor (B) Inductor (C) Switch (D) Fuse

45. α-particle consists of:
(A) 2 protons and 2 neutrons only
(B) 2 electrons, 2 protons and 2 neutrons
(C) 2 electrons and 4 protons only
(D) 2 protons only

46. Which part of the brain is responsible for thermoregulation?
(A) Cerebrum
(B) Hypothalamus
(C) Corpus callosum
(D) Medulla oblongata

47. Ozone hole refers to
(A) Hole in ozone layer
(B) Decrease in the ozone layer in troposphere
(C) Decrease in thickness of ozone layer in stratosphere
(D) Increase in the thickness of ozone layer in troposphere

48. How does steroid hormone influence the cellular activities?
(A) Changing the permeability of the cell membrane
(B) Binding to DNA and forming a gene hormone complex
(C) Activating cyclic AMP located on the cell membrane
(D) Using aquaporin channels as second Messenger

49. The correct sequence of phases of cell cycle is:
(A) M → G1 → G2 → S
(B) G1 → G2 → S → M
(C) S → G1 → G2 → M
(D) G1 → S → G2 → M

50. The ciliated epithelial cells are required to move particles or mucus in a specific direction. In humans, these cells are mainly present in
(A) Bile duct and Bronchioles
(B) Fallopian tubes and Pancreatic duct
(C) Eustachian tube and Salivary duct
(D) Bronchioles and Fallopian tubes

51. Which of the following statements is not correct?
(A) Lysosomes have numerous hydrolytic enzymes
(B) The hydrolytic enzymes of lysosomes are active under acidic pH

(C) Lysosomes are membrane bound structures
(D) Lysosomes are formed by the process of packaging in the endoplasmic reticulum

52. Which one of the following equipments is essentially required for growing microbes on a large scale, for industrial production of enzymes?
(A) BOD incubator (B) Sludge digester
(C) Industrial oven (D) Bioreactor

53. Which of the following pair of organelles does not contain DNA?
(A) Mitochondria and Lysosomes (B) Chloroplast and Vacuoles
(C) Lysosomes and Vacuoles (D) Nuclear envelope and Mitochondria

54. Which of the following facts will distinguish whether a cell is prokaryotic or eukaryotic?
(A) The presence or absence of a rigid cell wall
(B) The presence or absence of internal membranes partitioning the cells
(C) The presence or absence of Ribosomes
(D) The presence or absence of DNA as the Genetic material

55. Facultative absorption of water from primary urine is influenced by the hormone
(A) Vasopressin (B) Androgens (C) Thyroxine (D) Epinephrine

56. The immune system when work against self is called
(A) Self immune system (B) Autoimmunity
(C) Specific immunity (D) None of these

57. Movement of cell against concentration gradient is called
(A) Osmosis (B) Active transport
(C) Diffusion (D) Passive transport

58. Which of the following is not a fat soluble vitamin?
(A) Vitamin A (B) Vitamin D (C) Vitamin C (D) Vitamin E

59. Based on per molecule, which of the following gas has the most powerful greenhouse effect?
(A) CO_2 (B) CH_4 (C) N_2O (D) CFCs

60. DNA is associated with highly basic- proteins called—
(A) Histones (B) Non-Histones (C) Albumins (D) All of these

61. Which among the following is the simplest method to estimate the concentration of glycerol in an aqueous solution of glycerol?
(A) UV absorption spectroscopy (B) Gas chromatography
(C) pH measurement (D) Viscosity measurement

62. Insulin is secreted by _____
(A) Spleen (B) b-cells of pancreas

(C) a-cells of pancreas (D) Mucosa oesophagus

63. Serum is—
(A) Blood minus fibrinogen (B) Lymph minus corpuscles
(C) Lymph (D) Blood minus corpuscles and fibrinogen

64. The study related to the structure and function of cell is known as—
(A) Cytology (B) Histology
(C) Anatomy (D) Palynology

65. Origin of replication usually contains:
(A) GC rich sequences (B) Both AT and GC rich sequences
(C) No particular stretch of sequences (D) AT rich sequences

66. Thymine dimers are formed due to:
(A) High temp (B) UV radiations
(C) 5-bromouracil (D) Nitrous acid

67. During PAGE gel formation, acrylamide is activated by free radicals of:
(A) Ammonium persulfate (APS) (B) Tetramethylethylenediamine (TEMED)
(C) Sodium dodecyl sulfate (SDS) (D) Oxygen

68. Genbank is the database of :
(A) The European Molecular Biology Laboratory (EMBL)
(B) DNA Data Bank of Japan (DDBJ)
(C) SWISSPROT
(D) The National Center for Biotechnology Information (NCBI)

69. Which of the following is a sulphur containing amino acid?
(A) Glycine (B) Methionine (C) Threonine (D) Cytosine

70. Combination of purine pyrimidine base with pentose sugar is known as :
(A) Nucleotide (B) Nucleoside (C) Nucleic acid (D) Ribosome

71. In an alpha helical polypeptide, the back bone hydrogen bonds are between
(A) NH of n and CO of n + 4 amino acids (B) CO of n and NH of n + 3 amino acids
(C) CO of n and NH of n + 4 amino acids (D) NH of n and CO of n + 3 amino acids

72. Elongation during DNA synthesis begins from the :
(A) 5′end of a RNA primer (B) 5′end of the leading strand
(C) 3′end of DNA polymerase (D) 3′end of RNA primer

73. The most widely used scripting language in Bioinformatics is :
(A) Pascal (B) C (C) Oracle (D) Perl

74. The site of oxidation in a cell is the :
(A) Mitochondrion (B) Endoplasmic reticulum

(C) Golgi apparatus (D) Ribosomes

75. The structure of collagen is :

(A) Triple helix (B) Double helix

(C) Single helix (D) Beta stranded

x-x-x