

## BIOCHEMISTRY

1. The chirality of an amino acid results from the fact that its carbon:  
(A) has no net charge  
(B) is a carboxylic acid  
(C) is bonded to four different chemical groups  
(D) is in the L absolute configuration in naturally occurring proteins
2. The contour length of DNA in a human cell is:  
(A) 2 nm                      (B) 2 mm                      (C) 2 cm                      (D) 2 m
3. Which is not true about triacylglycerols  
(A) they are also called as neutral fats                      (B) they are the major form of stored lipids  
(C) they are hydrophilic in nature                      (D) they are hydrophobic in nature
4. If a carbohydrate has 5 chiral carbons, then the no of stereoisomers it can form is:  
(A) 25                      (B) 32                      (C) 125                      (D) 16
5. In proteins, all of the following are considered "weak" interactions, except:  
(A) hydrogen bonds                      (B) hydrophobic interactions  
(C) ionic bonds                      (D) peptide bonds
6. All enzymes are made up of:  
(A) Proteins                      (B) RNA  
(C) Proteins & RNA                      (D) Proteins, Lipids & RNA

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7. The pH of a sample of blood is 7.4, while gastric juice is pH 1.4. The blood sample has:
- (A) 5.29 times lower  $[H^+]$  than the gastric juice
  - (B) 6 times lower  $[H^+]$  than the gastric juice
  - (C) 6,000 times lower  $[H^+]$  than the gastric juice
  - (D) a million times lower  $[H^+]$  than the gastric juice
8. In plants, during photosynthesis, photosystem I passes electrons from :
- (A) its excited reaction center, P700, through a series of carriers to ferredoxin, which then reduces  $NADP^+$  to NADPH
  - (B) P680 to plastoquinone, and the electrons lost from P680 are replaced by electrons from  $H_2O$  excited special pair of chlorophyll molecules
  - (C) through pheophytin, to quinones
  - (D) quinones through the cytochrome b<sub>6</sub> complex, and back to the photoreaction center
9. By adding SDS (sodium dodecyl sulphate) during the electrophoresis of proteins, it is possible to:
- (A) determine a protein's isoelectric point
  - (B) determine the amino acid composition of the protein
  - (C) preserve a protein's native structure and biological activity
  - (D) separate proteins exclusively on the basis of molecular weight
10. How many ATP molecules are required to fix one  $N_2$  molecule?
- (A) 2                      (B) 4                      (C) 10                      (D) 12

11. The amount of yolk determines  
(A) Types of eggs (B) Blastulation (C) Gastrulation (D) All of the above
12. During cleavage  
(A) The number of cells increases  
(B) The number of cells increases, but the size of the embryo remains unchanged  
(C) There is an increase in both the number of cells and size of the embryo  
(D) There is neither an increase in number of cell nor in the size of the embryo
13. The process by which developing cells achieve their functional, mature identity a sliver, or muscle, or nerve is called:  
(A) cleavage division (B) pattern formation  
(C) morphogenesis (D) differentiation
14. In angiosperms, the endosperms is;  
(A) haploid (B) diploid (C) triploid (D) tetraploid
15. After fertilization, the seed coat develops from  
(A) Embryosac (B) Integument (C) Chalaza (D) Ovule
16. DMSO is used as  
(A) Gelling agent (B) Alkylating agent (C) Cryoprotectant (D) Chaelating agent

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17. What is a callus?

- (A) tissue that forms an embryo
- (B) tissue that develops to an embryo
- (C) first root of a plant in culture
- (D) an unorganized and actively dividing mass of cells maintained in plant tissue culture

18. In animal cell culture, particularly mammalian cell culture, transformation means

- (A) uptake of new genetic material
- (B) phenotypic modifications of cells in culture
- (C) both (A) and (B)
- (D) release of genetic information

19. The function of cristae in a mitochondrion is :

- (A) electron transport and ATP synthesis
- (B) intake of  $O_2$
- (C) elimination of  $CO_2$
- (D) carbon assimilation

20. Function of Golgi bodies in plants is

- (A) synthesis of cell wall
- (B) translocation of enzymes
- (C) transport of metabolites
- (D) production of microbodies

21. The Dolly sheep was cloned at:

- (A) University of California
- (B) Roslin Institute, Scotland
- (C) Indian Agricultural Research Institute
- (D) Cambridge University

22. Jamunapari is breed of  
 (A) Cow (B) Goat (C) Buffalo (D) None of the above
23. Significant deviation of regression coefficient 'b' from unity in Hayman's Vr-Wr graph indicates  
 (A) Presence of epistasis (B) Absence of epistasis  
 (C) Presence of G xE interaction (D) Presence of dominance
24. Dyad is  
 (A) a pair of homologous chromosomes  
 (B) a pair of non-homologous chromosomes  
 (C) a pair of sister chromosomes  
 (D) a pair of non-sister chromosomes
25. Exhibition of superiority by a hybrid over both of its parent is known as  
 (A) Heterosis (B) Hybridization (C) Hypostasis (D) Dominance
26. An offspring from two homozygous parents different from one another by alleles at only one gene locus is known as  
 (A) Monohybrid (B) Dihybrid (C) Trihybrid (D) Backcross
27. Probiotics are:  
 (A) Cancer inducing microbes (B) Safe antibiotics  
 (C) New kind of food allergens (D) Live microbial food supplement

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28. The technique of obtaining large number of plantlet by tissue culture method is called:
- (A) Plantlet culture (B) Micropropagation  
(C) Organ culture (D) Macropropagation
29. Golden rice is a transgenic crop of the future with the following improved trait.
- (A) Insect resistance (B) High protein content  
(C) High vitamin A content (D) High lysine content
30. Batch cultures are type of suspension culture where
- (A) medium is completely replaced  
(B) medium is loaded only at the beginning  
(C) no depletion of medium occurs  
(D) cellular wastes are continuously removed and replaced
31. Haploid plants are produced in large numbers by
- (A) Anther culture (B) Ovary culture (C) Both A and B (D) Embryo culture
32. Phosphoenol pyruvate (PEP) is primary  $\text{CO}_2$  acceptor in
- (A)  $\text{C}_4$  plants (B)  $\text{C}_3$  plants  
(C)  $\text{C}_2$  plants (D) Both  $\text{C}_3$  and  $\text{C}_4$  plants

33. Which of the following is widely used as a rooting hormone:
- (A) NAA                      (B) 2,4-D                      (C) 2,4,5-T                      (D) Cytokinin
34. Light generated energy during photosynthesis is
- (A) ADP                      (B) NADP                      (C) ATP                      (D) NADPH<sub>2</sub>
35. Which of the following is the shortest event in a cardiac cycle:
- (A) QRS interval      (B) ST segment                      (C) ST interval                      (D) RR interval
36. pH of cerebrospinal fluid is :
- (A) 7.53                      (B) 7.23                      (C) 7.03                      (D) 7.43
37. Vitamin B<sub>12</sub> is mainly absorbed in the
- (A) terminal illeum                      (B) upper jejunum
- (C) duodenum                      (D) stomach
38. The volume of air in the lungs at the end of a normal passive expiration is termed as:
- (A) Vital capacity                      (B) Residual volume
- (C) Functional residual capacity                      (D) Inspiratory capacity
39. The amount of light entering in the eye is controlled by
- (A) Lens                      (B) Cornea                      (C) Pupil                      (D) Iris

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40. Mammals living in deserts have :

- (A) Large kidneys (B) Long loop of Henle  
(C) Short loop of Henle (D) More thicker convulated tubules

41. The estrous cycle is influenced by:

- (A) Nutritional status (B) Temperature  
(C) Light (D) All of these

42. Which of the following is a thick filament of muscle?

- (A) Actin (B) Myosin (C) Troponin (D) Tropomyosin

43. Hypersecretion of somatotrophic hormone (STH) results in :

- (A) Acromegaly (B) Myxoderma  
(C) Conn's disease (D) Exophthalmic goitre

44. Duplication of mitochondrial DNA takes place during :

- (A)  $G_1$  phase (B) S phase (C)  $G_2$  phase (D)  $G_0$  state

45. Which one of the following is the most variable histone?

- (A)  $G_1$  phase (B) S phase (C)  $G_2$  phase (D)  $G_0$  state

46. Which of the following is not a chemical change?

- (A) Rusting of iron (B) Burning of magnesium  
(C) Sublimation of iodine (D) Electrolysis of water

47. The atomic number of an element represents

- (A) number of neutrons in the nucleus
- (B) number of neutrons and protons in the nucleus
- (C) number of protons in the nucleus
- (D) the valency of the electron

48. Which of the following statements regarding natural radioactivity is true?

- (A) It is spontaneous disintegration of atoms
- (B) it is induced by bombardment with projectiles
- (C) It is transmutation of atoms with projectiles
- (D) It is dependent on temperature

49. Tincture iodine is a solution of:

- (A) iodine in potassium iodide
- (B) iodine in alcohol
- (C) iodine in water
- (D) iodine in carbon disulphide

50. Solid carbon dioxide (dry ice) is also known as:

- (A) Thiokol
- (B) Drikold
- (C) Perhydrol
- (D) Mannitol

51. Which gas is used for artificial ripening of green fruit?

- (A) Ethylene
- (B) Acetylene
- (C) Ethane
- (D) Methane

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52. The anode in dry cell consists of:
- (A) Zinc            (B) Copper            (C) Graphite            (D) Cadmium
53. Quartz is made of which of the following:
- (A) sodium silicate            (B) calcium sulphate  
(C) calcium silicate            (D) sodium sulphate
54. Milk is a colloid system in which :
- (A) water is dispersed in fat  
(B) fat is dispersed in water  
(C) fat and water are dispersed in each other  
(D) fat is dissolved
55. Galvanized iron is made by coating iron with:
- (A) Zinc            (B) Nickel            (C) Chromium            (D) Lead
56. You have 500 mL of 1M solutions of NaCl, Na<sub>2</sub>SO<sub>4</sub>, Na<sub>3</sub>PO<sub>4</sub> and Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>. Which solution will have the highest boiling point?
- (A) NaCl (aq)            (B) Na<sub>2</sub>SO<sub>4</sub> (aq)            (C) Na<sub>3</sub>PO<sub>4</sub> (aq)            (D) Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> (aq)
57. The strongest reducing agent is
- (A) HNO<sub>2</sub>            (B) H<sub>2</sub>S            (C) H<sub>2</sub>SO<sub>3</sub>            (D) SnCl<sub>2</sub>

58. At NTP 5.6 litres of oxygen is equivalent of

- (A) 1 mole      (B) 1/2 mole      (C) 1/4 mole      (D) 1/8 mole

59. Number of electrons in 1.8 ml of  $H_2O$  is

- (A)  $6.023 \times 10^{23}$     (B)  $0.6022 \times 10^{23}$     (C)  $3.011 \times 10^{23}$     (D)  $6.022 \times 10^{24}$

60. Glass is a

- (A) supercooled liquid      (B) crystalline solid  
(C) non-crystalline solid      (D) liquid crystal

61. Which is used to produce artificial rain?

- (A) sand      (B) silver iodide      (C) silver nitrate      (D) copper oxide

62. In graphite, carbon atoms form interlinked \_\_\_\_\_ membered rings.

- (A) four      (B) five      (C) six      (D) seven

63. Germanium is an example of

- (A) an intrinsic semiconductor      (B) a *n*-type semiconductor  
(C) a *p*-type semiconductor      (D) insulator

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64. The decreasing order of the size of void is

- (A) Cubic > Octahedral > Tetrahedral > Trigonal
- (B) Trigonal > Tetrahedral > Octahedral > Cubic
- (C) Trigonal > Octahedral > Tetrahedral > Cubic
- (D) Cubic > Tetrahedral > Octahedral > Trigonal

65. Band theory of metals is based on

- (A) valence bond theory
- (B) molecular orbital theory
- (C) crystal field theory
- (D) ligand field theory

66. With increase in temperature, the electrical conductivity of semiconductors

- (A) decreases
- (B) remains same
- (C) increases
- (D) None of these

67. Which of the following is ferromagnetic in nature?

- (A) Ni
- (B) Co
- (C)  $\text{CrO}_2$
- (D) All of these

68. Bronze is an alloy of

- (A) copper and zinc
- (B) copper and tin
- (C) tin and zinc
- (D) iron and zinc

69. The ore of manganese is

- (A) bauxite
- (B) carninerite
- (C) phrolusite
- (D) pentlandite

70. When aluminium reacts with alkalis, the gas liberated is  
(A) chlorine (B) nitrogen (C) hydrogen (D) oxygen
71. Number of electrons that constitute one ampere of current is :  
(A)  $265 \times 10^{16}$  (B)  $625 \times 10^{12}$  (C)  $4.8 \times 10^{10}$  (D)  $625 \times 10^{16}$
72. The radius of hydrogen atom, when it is in its second excited state, becomes :  
(A) Half (B) Double (C) Four times (D) Nine times
73. In the lowest energy level of hydrogen atom, electron has the angular momentum  
(A)  $\pi/h$  (B)  $h/\pi$  (C)  $h/2\pi$  (D)  $2\pi/h$
74. Which of the following does not have the same dimension?  
(A) Electric flux, electric field, electric dipole moment  
(B) Pressure, stress, Young's modulus  
(C) Electromotive force, potential difference, electric voltage  
(D) Heat, potential energy, work done
75. Parsec is the unit of:  
(A) Distance (B) Frequency  
(C) Angular momentum (D) Time

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76. A force  $F$  is given by  $F=at+bt^2$ , where  $t$  is time. What are the dimension of  $a$  and  $b$  :
- (A)  $MLT^1, MLT^0$  (B)  $MLT^{-1}, MLT^{-4}$  (C)  $MLT^3, ML^2T^4$  (D)  $ML^{-3}T, MLT^{-4}$
77. A chocolate cookie has a circular disk of diameter  $8.50 \pm 0.02$  cm and thickness  $0.050 \pm 0.005$  cm. The average volume in cm is :
- (A)  $2.83 \pm 0.3$  (B)  $2.38 \pm 0.27$  (C)  $11.35 \pm 1.2$  (D)  $9.31 \pm 1.12$
78. A body is dropped into a well 19.6 m deep. After how much time the sound will be heard by the person who had thrown the body if velocity of sound is 300 m/s?
- (A) 0.065 s (B) 3.065 s (C) 2.198 s (D) 2.065 s
79. A ball is dropped on the ground from a height of 2 m. If the coefficient of restitution is 0.6, the height to which the ball will rebound is:
- (A) 1.72 m (B) 0.72 m (C) 2.86 m (D) m
80. A block of mass  $m$  slides down along the surface of the bowl having radius  $R$  from the rim to the bottom. The velocity of the block at bottom will be:
- (A)  $\sqrt{2}gR$  (B)  $2gR$  (C)  $\sqrt{3}gR$  (D)  $3gR$
81. An electric motor creates a tension of 4000 newtons in a hosting cable and reels it in at the rate of 3 m/sec. What is the power of electric motor?
- (A) 9 kW (B) 12 kW (C) 18 kW (D) 24 kW
82. A massive ball moving with speed  $V$  collides with a tiny ball of negligible mass. The collision is perfectly elastic. The second ball will move with a speed equal to :
- (A) 0 (B)  $V$  (C)  $2V$  (D)  $3V$

83. Two bodies with kinetic energies in ratio of 4:1 are moving with equal linear momentum. The ratio of their masses is :
- (A) 1 : 2                      (B) 4 : 1                      (C) 1 : 4                      (D) 1 : 1
84. A light and a heavy body have equal momentum which one has greater kinetic energy?
- (A) light body                      (B) nothing can be said
- (C) heavy body                      (D) None of the above
85. Which of the following is not a measure of central tendency?
- (A) Percentile                      (B) Quartile
- (C) Standard deviation                      (D) Mode
86. Sum of dots when two dice are rolled is
- (A) a discrete variable                      (B) a continuous variable
- (C) a constant                      (D) a qualitative variable
87. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?
- (A) 60.4%                      (B) 48.3%                      (C) 35.7%                      (D) 27.8%
88. In a Poisson probability distribution
- (A) The mean and variance of the distribution are same (equal)
- (B) The probability of success is always greater than 5
- (C) The number of trials is always less than 5
- (D) It always contains a contingency table

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89. According to Boolean algebra absorption law, which of following is correct?

- (A)  $x + xy = x$       (B)  $(x+y) = xy$       (C)  $xy + y = x$       (D)  $x + y = y$

90. A Boolean function may be transformed into

- (A) logical diagram      (B) logical graph  
(C) map      (D) matrix

91. The following infinite series represents  $1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \dots$

- (A)  $e$       (B)  $\pi$       (C)  $\infty$       (D)  $\sqrt{5}$

92. The derivative of  $2^x$  with respect to  $x$  is

- (A)  $\ln(x) \cdot 2^x$       (B)  $x \cdot 2^{x-1}$       (C)  $\ln(2) \cdot 2^x$       (D)  $2 \cdot 2^{x-1}$

93. The function  $y = 1$  is an equation of a

- (A) point      (B) line with a slope of 0  
(C) line with a slope of infinity      (D) line with a slope of 1 passing through (1,1)

94. If  $A$  and  $B$  are sets and  $A \cup B = A \cap B$ , then

- (A)  $A = \Phi$       (B)  $B = \Phi$       (C)  $A = B$       (D) None of these

95. Let  $S$  be an infinite set and  $S_1, S_2, S_3, \dots, S_n$  be sets such that  $S_1 \cup S_2 \cup S_3 \cup \dots \cup S_n = S$  then
- (A) at least one of the sets  $S_i$  is a finite set  
 (B) not more than one of the set  $S_i$  can be finite  
 (C) at least one of the sets  $S_i$  is an finite set  
 (D) None of these
96. In how many ways can 8 Chemistry and, 4 Botany and 4 Zoology students can be seated in a row so that all person of the same subject sit together?
- (A)  $3! 4! 8! 4!$       (B)  $3! 8!$       (C)  $4! 4!$       (D)  $8! 4! 4!$
97. In how many ways can 10 examination papers be arranged so that the best and the worst papers never come together?
- (A)  $8 * 9!$       (B)  $8 * 8!$       (C)  $7 * 9!$       (D)  $9 * 8!$
98. In how many ways 2 students can be chosen from the class of 20 students?
- (A) 180      (B) 190      (C) 200      (D) 210
99. If  $5 * {}^n P_3 = 4 * {}^{(n+1)} P_3$ , find  $n$ ?
- (A) 10      (B) 12      (C) 14      (D) 16
100. Which one of the following enzymes is an established intracellular antioxidant ?
- (A) Lactate dehydrogenase      (B) Phenylalanine hydroxylase  
 (C) Superoxide dismutase      (D)  $\gamma$ -secretase