B. Sc Biosciences Admission Test, 2013

PRESIDENCY UNIVERSITY, KOLKATA

Presidency University
Kolkata

Select the correct answer from the options provided for each question and fill the appropriate position in the OMR sheet:

SET-D

1. Primitive eukaryotes led to the evolution (a) Fungi & plants (b) Animals & plants (c) Unicellular eukaryotes only (d) Fungi, plants, animals & protists.
2. A plant species that has on each individual plant, flowers with stamens and flowers with carpels is (a) Perfect (b) Imperfect (c) Monoecious (d) Dioecious
3. The shoot apical meristem in a dicot embryo is located - (a) Between two cotyledons (b) Within the root apex (c) Around the suspensor (d) In the endosperm
4. Restriction enzymes are used to cut(a) Single stranded RNA (b) Double stranded DNA (c) Single stranded DNA (d) Double stranded RNA
5. Devil fish belongs to: (a) Class Osteichthyes (b) Class Chondrichthyes (c) Phylum Mollusca (d) Phylum Arthropoda.
6. The main nitrogenous waste excreted by a fish is: (a) Ammonia (b) Urea (c) Uric acid (d) Creatinine.
7. When the two ecosystems overlap each other, the area is called (a) Habitat (b) Niche (c) Ecotone (d) Ecotype
8. If a double helical DNA molecule contains 30% adenine, then what is the percentage of guanine (a) 30%

   (b) 20% (c) 50% (d) 40%.
9. Bombay phenotype is a rare phenomenon in ABO blood group system of human. It is an example of (a) Dominant epistasis (b) Recessive epistasis (c) Duplicate recessive epistasis (d) None of the above
10. Universal recipient person have blood group (a) O+ (b) O- (c) AB+ (d) AB-
11. The major process for formation of urine in human kidney is through (a) Diffusion (b) Osmosis (c) Ultra filtration (d) Pinocytosis
12. The major area for controlling movement is (a) Cerebellum (b) Thalamus (c) Medulla (d) Pons
13. A problem in mathematics is given to three students A, B, C and respective probability of solving the problem is $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$. Then the probability that the problem is solved is (a) $\frac{3}{4}$ (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{7}{8}$

14. The order and degree of the differential equation $\frac{d^2y}{dx^2} = \sqrt{1 + (\frac{dy}{dx})^3}$ are respectively (a) 1, 3 (b) 2, 3 (c) 2, 2 (d) 3, 2

15. If $a^x = b^y = c^z$ & a, b, c are GP , then x, y, z are in (a) AP (b) GP (c) HP (d) None of these
16. In which of the following transitions will the wavelength be minimum? (a)n =5 to n = 4 (b) n = 4 to n=3 (c) n =3 to n = 2 (d) n =2 to n =1
17. The distance of eye-lens from the retina is x. For a normal eye, the maximum focal length of the eye-lens
    (a) < x (b) = x (c) > x (d) = 2x
18. The inverse square law of intensity (i.e. Intensity $\propto \frac{1}{r^2}$) is valid for a (a) point source (b) plane source (c) line source (d) cylindrical source
19. V and E are the gravitational potential and gravitational field at a distance r from the centre of a uniform spherical shell. Consider the following statements I) Plot of V against r is discontinuous II) Plot of E against r is discontinuous (a) Both I and II are correct (b) I is correct but II is wrong (c) II is correct but I is wrong (d) Both I and II are correct
20. The speed of alpha particle is (a) 100000 miles/sec (b) 18000 miles/sec (c) 186000 miles/sec (d) 180 mm/sec.
21. Germanium is an example of (a) an intrinsic semi conductor (b) a n-type semi conductor (c) a p-type semi conductor (d) an insulator
22. The time taken for 10% completion of first order reaction is 20 min. Then for 19% completion, the reaction will take (a) 40 min (b) 60 min (c) 30 min (d) 50 min
23. Which of the following molecule does not have π bond in it? (a) CO (b)CO_2 (c) H_2O_2 (d) SO_2
24. Hydrogen ion concentration in mol.L^{-1} in a solution of ph 5.4 is (a) 3.98×10^{-6} (b) 3.68×10^{-6} (c) 3.68×10^{6} (d) 3.98×10^{6}
25. A metallic salt that prevails in bones is (a) Calcium carbonate (b) Calcium phosphate (c) Calcium sulphate (d) Calcium chloride.
26. Mendel was considered as lucky because (a) genes of pea were not linked. (b) he studied one allelic pair at a time. (c) pairs of characters which he studied in a single experiment were not linked. (d) genes of pea assort independently due to high frequency of crossing-over.
27. Which of the following statements about photosynthetic autotrophs is FALSE? (a) They obtain their required organic

compounds from external sources. (b)They channel radiant energy into the biosphere. (c)The word autotroph means "self-feeder." (d) They have a complex pigment system.

28. The activity of the _____ results in a thickening of stems, branches, and roots. (a) xylem and phloem regions (b) epidermal regions (c) vascular systems (d) lateral meristems
29. In plant cells, genetic information is found in the: (a) nucleus only. (b) nucleus and mitochondria only. (c) nucleus and plastids only. (d) nucleus, plastids, and mitochondria only
30. Choose the right order which denotes genetic diversity
    (a)Chromosomes – Nucleotides – Genes – Individuals – Populations
    (b) Populations – Individuals – Chromosomes – Nucleotides – Genes
    (c)Genes – Nucleotides – Chromosomes – Individuals – Populations
    (d) Nucleotides - Genes – Chromosomes – Individuals – Populations
31. The hormone melatonin is secreted from (a) Pineal body (b)Hypothalamus (c) Ovary (d) Thymus
32. Which of the following hormones is not secreted from adenohypophysis? (a) LH (b) ADH (c) STH (d) ACTH
33. The number of Barr body found in somatic cells of a normal human male is: (a) 0 (b) 1 (c) 2(d) None of these.
34. Anticodon is found in: (a) mRNA (b) tRNA (c) rRNA (d) hnRNA.
35. In primary response to an antigen, the first immunoglobulin class to be produced is: (a) IgM (b) IgG (c) IgA (d) IgE
36. The percentage of oxygen in expiratory air in case of human beings is …….(a) 2.09 (b) 16.9 (c) 20.9 (d) 79 .9
37. The energy that is required during muscle contraction is (a) UPP (b) ATP (c) phosphagen (d) ADP
38. When the gamete nuclei of the small cell unite together then the process is termed as (a) Merogamy (b) Anisogamy (c) Automixis (d) Macrogamy
39. A club has 5 members- A, B, C, D & E. To select chairman and secretary, one member cannot occupy both the positions. What is the probability that A is the chairman? (a) 0.5 (b) 0.2 (c)0.8 (d) 0.9
40. The number of values of x for which $f(x) = \cos x + \cos \sqrt{2x}$ attains its maximum value, is a (b) 0 (c) 2 (d) Infinite
41. The mean square speed of the molecules of a gas at absolute temperature T is proportional to (a) $\frac{1}{T}$ (b) $\sqrt{T}$ (c)T (d)T^2
42. Four cylinders contain equal number of moles of argon, hydrogen, nitrogen and carbon dioxide at the same temperature. The energy is minimum in (a)Argon (b) Hydrogen (c) Nitrogen (d) Carbon dioxide
43. Which of the following phenomena support the wave theory of light? i)Scattering ii) Interference iii) diffraction iv) Velocity of light in a denser medium is less than the velocity of light in the rarer medium
    (a) i, ii, iii (b) i, ii, iv (c) ii, iii, iv (d) i, iii, iv
44. The propeller of a ship makes 350 revolutions while its speed increases from 200 rpm to 500 rpm. The time taken for this is (a) 1 min (b) 53 secs (c)1.2 min (d) 10 min
45. When light is refracted, which of the following does not change? (a) Wavelength (b) Velocity (c) Frequency (d) Amplitude
46. Soldiers are not allowed to pass in synchronized march over a bridge because (a) It produces more noise (b) Uniform force distribution will break the bridge (c) Bridge may break due to resonance (d) Center of mass of the bridge will increase
47. The group linkage present in fats is (a) peptide linkage (b) ester linkage (c) glycosidic linkage (d) none of these
48. Carbon-carbon bond is not found in (a) Cannizzaro reaction (b) Wurtz reaction (c) Aldol condensation (d) Friedel Crafts reaction
49. The reagent with which both acetaldehyde and acetone react easily (a) Tollen's reagent (b) Grignard reagent (c) Fehling solution (d) Schiff's reagent
50. The density of gas A is twice that of gas B. If the molecular weight of gas A is M the molecular weight of the gas B is (a) M (b) 2M (c) M/2 (d) 4M
51. Which of the following statements about photosynthetic autotrophs is FALSE? (a) They obtain their required organic compounds from external sources. (b) They channel radiant energy into the biosphere. (c) The word autotroph means "self-feeder."(d) They have a complex pigment system.
52. Meiosis II contributes to (a) Splitting of centromere (b) Separation of homologous (c) Reduction in chromosome number (d) Reduction in the genome
53. Mitochondrial DNA is: (a) Single stranded and linear (b) Single stranded but circular (c) Double stranded and linear (d) Double stranded but circular.
54. Which of the following lists the phases of the cell cycle in the correct sequence? (a) G_1, G_2, S, M
    (b) G_1, G_2, M, S (c) G_1, S, G_2, M (d) G_2, G_1, S, M.
55. Birds do not have: (a) Gall bladder (b) Urinary bladder (c) Teeth (d) All of these.
56. Retrogressive metamorphosis is observed in the life cycle of: (a) Hemichordata (b) Urochordata (c) Cephalochordata (d) All of these
57. Carcinology refers to the study of: (a) Cancer (b) Crustaceans (c) Cartilage (d) Cyclostomata
58. Only the left aortic arch is found in: (a) Amphibia (b) Reptilia (c) Aves (d) Mammalia
59. In respiration, electrons are extracted from glucose and ultimately accepted by: (a) ATP (b) oxygen (c) carbon dioxide (d) water
60. Antibodies are secreted by (a) T-lymphocytes (b) B-lymphocytes (c) Macrophages (d) Natural Killer cells
61. ---------- connects the 3rd and 4th ventricle of human brain (a) Foramen of magnum (b) Foramen of Monroe (c) neural canal (d) neural tube
62. Find the rate limiting enzyme of gluconeogenesis(a) HM reductase G-Co (b) PEPcarboxykinase (c) Acetyl- CoA carboxylase (d) Phosphofructokinase
63. $6^{2x+4} = (3^{3x}).(2x+8)$ find he value of X (a) 3 (b) 2 (c) 4 (d)1/2

64. P is a variable point on the hyperbola $x^2 - y^2 = a^2$ and A(2a,0) is a fixed point ; then the locus of the mid-point of AP is a/an (a) Circle (b) Parabola (c) Ellipse (d) Hyperbola

65. Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is divisible by 4 or 6? (a) 7/18 (b) 5/18 (c) 5/12 (d) 1/10

66. The energy of a given sample of an ideal gas depends on its (a) Volume (b) Pressure (c) Density (d) Temperature

67. Among the given options, the velocity of sound is highest in (a) Hydrogen (b) Air (c) Water (d) Steel

68. At a particular concentration of substrates and products the reaction below has a negative ΔG. A+B→C+D ΔG= -4.5 Kcal/mol. At the same concentrations, what is ΔG for the reverse reaction? (a) 0 kcal/mol (b) -4.5 kcal/mol (c) +4.5 kcal/mol (d) -1 kcal/mol

69. In thermodynamics, a closed system may be define as: (a) that can not exchange both heat and also mass with its surroundings (b) that can exchange heat but not mass with its surroundings (c) that can exchange both heat and mass with its surroundings (d) none of the above

70. A protein, when placed in a medium having a pH higher than its isoelectric pH, will behave as (a) Cation (b) Anion (c) Zwitterion (d) any of the given options.

71. The kind of fission favoured by sunlight is (a) Heterolytic fission (b) Homolytic fission (c) both 'a' & 'b' (d) none of these

72. When the temperature is increased surface tension of water (a) increases (b) decreases (c) remains constant (d) shows irregular behavior

73. Radioactive carbon (C^{14}) emits (a) only alpha particle (b) only beta particle (c) alpha and beta particles (d) only gamma ray.

74. Carboxylic group shows acidic character because (a) it turns red litmus blue (b) it contains OH group (c) it reacts with alkalis to form salt (d) the carboxylate ion is resonance stabilized

75. Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives (a) p-nitrophenol (b) nitrobenzene (c) 2,4,6-trinitrobenzen (d) o-nitrophenol

76. Which of the following is **NOT** a function of Transpiration (a) Cooling of leaves (b) Uptake of minerals (c) Excretion of minerals (d) Uptake of water

77. Most of the dry weight of a tree comes from atoms acquired from (a) Soil (b) Water (c) Air (d) Decomposing leaves.

78. Which of the following is **NOT** a fruit (a)Flesh of a strawberry (b) Flesh of a peach (c) Pod of a pea (d) Flesh of a peanut

79. Most metabolism of a plant is carried out by the – (a) Epidermis (b) Collenchyma tissue (c) Sclerenchyma tissue (d) Parenchyma tissue

80. Two young brothers have a genetic disorder that is fatal before the age of 20, 40% of the time. What is the probability that at least one of the brothers will survive to the age of 20. (a) 0.16 (b) 0.36 (c) 0.48 (d) 0.24

81. Batrachology refers to the study of: (a) Millipeds (b) Moths (c) Amphibia (d) Elephants.

82. The full name of WWF is (a)World Wide Fund for Nature (b) World Wildlife Fund (c) World Wildlife Fund for nature and natural resources (d) World Wildlife and nature Fund

83. Which of the following is/are NOT part of the protoplast? (a) Nucleus (b) Organelles (c) Ribosomes (d) Cell wall

84. In a natural ecosystem, an inverted pyramid is evident in, (a) Detritus ecosystem (b) Parasitic food chain (c) Pond ecosystem (d) Forest food chain

85. The hemoglobin-oxygen saturation of blood entering the right ventricle is approximately (a) 95% (b) 85% (c) 75% (d) 55%

86. Ventricular muscle receive impulses directly from the (a) Purkinje system   (b) Bundle of His (c) Right and left bundle branches (d) AV node

87. Salk vaccine is used against (a) Polio (b)Small pox (c)Tuberculosis (d) Measles

88. Blood-testis barrier is formed by (a) Leydig cell (b) Spermatogonia (c) Sertoli cell (d) All

89. The maximum area of a rectangle that can be inscribed in a circle of radius 2 units is (a) 8π _sq. units (b) 4 sq. units (c) 5 sq. units   (d) 8 sq. units

90. The range of values of λ for which the point (λ,-1) is exterior to both the parabolas $y^2 = |x|$ is (a) (0,1)

    (b) (-1,1) (c) (-1,0) (d) none of these

91. One end of a metal rod is dipped in boiling water and other in melting ice. (a) All parts of the rod are in thermal equilibrium with each other (b) We can assign a temperature to the rod (c)We can assign a temperature to the rod after steady state is reached (d) The state of the rod does not change after steady state is reached

92. Mark the correct option (a) Gauss's law is valid only for symmetrical charge distribution (b) Gauss's law is valid only for charges placed in vacuum. (c) Electric field calculated by Gauss's law is the field due to the charges inside the Gaussian surface. (d) The flux of the electric field through a closed surface due to all the charges is equal to the flux due to the charges enclosed by the surface.

93. A dielectric slab is inserted between the plates of an isolated capacitor. The force between the plates will

    (a)   increase (b) decrease (c) remain unchanged (d) become zero

94. The speed of alpha particle is (a) 100000 miles/sec (b) 18000 miles/sec (c) 186000 miles/sec (d) 180 mm/sec.

95. Light passes through a closed cylinder containing a gas. If the gas is slowly pumped out, the speed of light will (a) Increase (b) Decrease (c) Remain unchanged (d) First increase and then decrease.

96. The permanent magnetic moment of the atoms of a material is not zero. The material (a) must be paramagnetic (b) must be diamagnetic (c) must be ferromagnetic (d) may be paramagnetic

97. Container A and B have the same gas. Pressure, volume, and temperature of A are all twice than those of B. The ratio of molecules of A and B is (a) 1:2 (b) 2:1 (c) 1:4 (d) 4:1

98. Avogadro number is (a) 6.023×10^{-23} atoms/mole (b) 6.023×10^{23} atoms/mole (c) 6.023×10^{23} atoms/gram (d) 6.023×10^{23} atoms/gram-equivalent weight.

99. A radioisotope that emits both beta particle and gamma ray can be exemplified by (a) N^{14} (b) I^{131} (c) H^3 (d) P^{32}.

100. Calculate the pH of a N/600 HCl solution. $Log_{10} 1.66 = 0.22$ (a) 1.66 (b) 2.78 (c) 16.6 (d) None