31/05/2020

CODE-A

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)
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Aakash Rank Booster Test Series for NEET-2020

MM : 720 **Test - 8** **Time : 3.00 Hrs.**

Topics covered : Complete Syllabus of Class XI and XII.

Instructions :

(i) Use blue/black ballpoint pen only to darken the appropriate circle.

(ii) Mark should be dark and should completely fill the circle.

(iii) Dark only one circle for each entry.

(iv) Dark the circle in the space provided only.

(v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.

(vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from total score.

PHYSICS

Choose the correct answer :

1. Two forces equal in magnitude, has resultant magnitude equal to either of two. The angle between two forces is

(1) 0° (2) 60°

(3) 90° (4) 120°

2. The dimensional formula of tension force is

(1) $[MT^{-2}]$

(2) $[MLT^{-2}]$

(3) $[MLT^{-1}]$

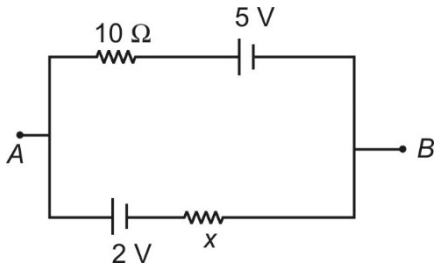
(4) $[ML^2L^{-2}]$

3. A proton moves from large distance, with a speed of v m/s directly towards a free proton initially at rest. The distance of closest approach of two protons is (symbol have usual meanings)

(1) $\frac{1}{4\pi\varepsilon_0}\frac{2e^2}{mv^2}$ (2) $\frac{1}{4\pi\varepsilon_0}\frac{4e^2}{mv^2}$

(3) $\frac{1}{4\pi\varepsilon_0}\frac{e^2}{mv^2}$ (4) $\frac{1}{4\pi\varepsilon_0}\frac{8e^2}{mv^2}$

4. In the circuit given, If $V_A - V_B = 4$ V, then resistance x will be



(1) 5 Ω (2) 10 Ω

(3) 15 Ω (4) 20 Ω

5. In a metallic conductor, drift velocity v_d is related with electric field E as

(1) $v_d \propto E^2$ (2) $v_d \propto E^{1/2}$

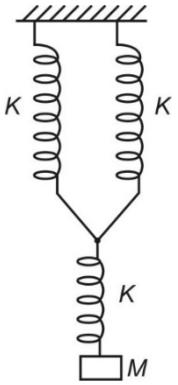
(3) $v_d \propto E^0$ (4) $v_d \propto E$

6. The height from surface of earth at which value of g becomes one fourth of that on earth's surface will be (R is radius of earth)

(1) 2.45 R (2) 1.45 R

(3) R (4) $\frac{5}{6}R$

7. The time period of mass M attached to the combination of three ideal and identical springs shown in figure is



(1) $T = 2\pi\sqrt{\frac{M}{K}}$ (2) $T = 2\pi\sqrt{\frac{M}{3K}}$

(3) $T = 2\pi\sqrt{\frac{3M}{2K}}$ (4) $T = 2\pi\sqrt{\frac{2M}{3K}}$

8. In Millikan's oil drop experiment an oil drop carrying a charge Q is held stationary by a potential difference of 600 V between the horizontal plates. To keep the drop of double the radius stationary the potential difference has to be 3200 V. The charge on second drop is

(1) $\frac{Q}{2}$ (2) $\frac{3Q}{2}$

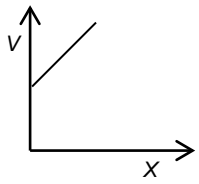
(3) $\frac{4Q}{3}$ (4) $\frac{8Q}{6}$

9. The radius of a disc is 1.2 cm. Its area according to idea of significant figures is $(\pi = 3.14)$

(1) 4.5216 cm^2 (2) 4.521 cm^2

(3) 4.52 cm^2 (4) 4.5 cm^2

10. The velocity – displacement graph of a particle moving in a straight line is as shown in figure. The acceleration of the particle is



(1) Constant

(2) Increases linearly with x

(3) Increases parabolically with x

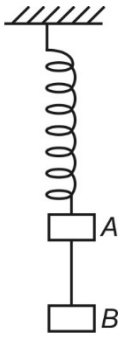
(4) none of these

11. A body is projected with a velocity of $(3\hat{i} + 4\hat{j})$ m/s. The maximum height attained by projectile is (g = 10 ms^{-2})

(1) 0.8 m (2) 8 m

(3) 4 m (4) 0.4 m

12. Two blocks A and B of masses 2 m and m respectively are connected by a massless inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitude of acceleration of A and B immediately after the string is cut, are respectively



(1) $g, \frac{g}{2}$ (2) $\frac{g}{2}, g$

(3) g, g (4) 2 g, g

13. The frictional force on a block of weight 10 N of area 0.1 m^2 is 5 N. If area of block is increased to 0.2 m^2, keeping weight and material same; the frictional force on new block would be (assume all other conditions to be same)

(1) 5 N (2) 10 N

(3) 2.5 N (4) 20 N

14. Under the action of a force a body of mass 5 kg moves such that its position as a function of time is given by $x = \frac{t^3}{3} + \frac{t^4}{4}$, where x is in metre and t is in second. The work done by force in first 2 s is

(1) 160 J (2) 30 J

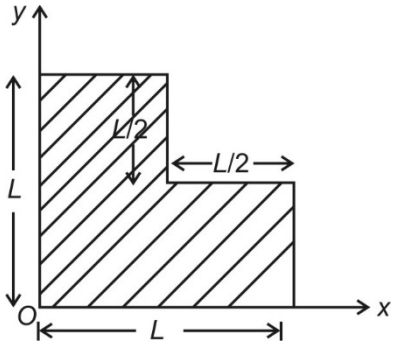
(3) 80 J (4) 360 J

15. Two equal masses initially moving along the same straight line with velocity +4 m/s and – 5 m/s respectively collides elastically. Their respective velocities after the collision will be

(1) – 5 m/s and + 3 m/s (2) + 4 m/s and – 4 m/s

(3) – 4 m/s and + 4 m/s (4) – 5 m/s and + 4 m/s

16. The centre of mass, Co-ordinates, of a uniform plate of shape as shown in figure is



(1) $\left(\frac{L}{2},\frac{L}{2}\right)$ (2) $\left(\frac{5L}{12},\frac{5L}{12}\right)$

(3) $\left(\frac{5}{3}L,\frac{2}{3}L\right)$ (4) $\left(\frac{3L}{4},\frac{L}{2}\right)$

17. A circular road of radius 10 m has angle of banking of 45°. If coefficient of friction between the road and tyre is 0.6, then the maximum safe speed of a car of mass 2000 kg will be (g = 10 m/s^2)

(1) 20 m/s (2) 25 m/s

(3) 24 m/s (4) 30 m/s

18. The radius of gyration of a uniform solid sphere about a tangent is

(1) $R\sqrt{\frac{2}{3}}$ (2) $R\sqrt{\frac{2}{5}}$

(3) $R\sqrt{\frac{5}{3}}$ (4) $R\sqrt{\frac{7}{5}}$

19. A block of mass m slides down on a smooth inclined plane and reaches the bottom with speed v. If the same mass is in the form of a ring which rolls down on an identical inclined plane, where friction is sufficient for pure rolling, the speed of ring at the bottom will be

(1) v (2) $v\sqrt{2}$

(3) $\frac{v}{\sqrt{2}}$ (4) $v\sqrt{\frac{2}{5}}$

20. A long vertical pole of length l is standing vertically with one end hinged at the floor. If the pole is released and allowed to fall, then the angular velocity of rod just before hitting the floor is

(1) $\omega=\sqrt{\frac{3g}{l}}$ (2) $\omega=\sqrt{3gl}$

(3) $\omega=\sqrt{\frac{3}{2}gl}$ (4) $\omega=\sqrt{\frac{3g}{2l}}$

21. A body of mass m is taken from earth surface to a height equal to radius 'R' of earth, the gain in potential energy is

(1) mgR (2) 2 mgR

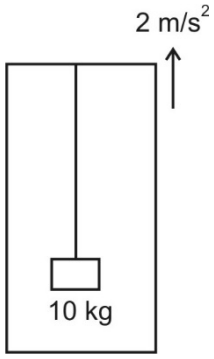
(3) $\frac{1}{2}mgR$ (4) $\frac{1}{4}mgR$

22. A planet moves around the sun. At a point P it is closest to sun at a distance d_1 and has speed v_1. At another point Q, when it is at distance d_2 farthest from sun, its speed will be

(1) $\frac{d_2v_1}{d_1}$ (2) $\frac{d_1v_1}{d_2}$

(3) $\frac{d_1^2v_1}{d_2}$ (4) $\frac{d_2^2v_1}{d_1}$

23. One end of a light steel wire is fixed to ceiling of an elevator moving up with an acceleration of 2 m/s^2 and a load of 10 kg hangs from other end. If cross sectional area of wire is 2 mm^2, the longitudinal strain in wire is (g = 10 m/s^2 , Y = 2 × 10^{11} N/m^2)



(1) 2.5 × 10^{-5} (2) 3.0 × 10^{-4}

(3) 2.0 × 10^{-5} (4) 2.5 × 10^{-4}

24. The work done in increasing the size of a soap film from 10 cm × 6 cm to 10 cm × 11 cm is 3 × 10^{-4} Joule. The surface tension of film is

(1) 1.5 × 10^{-2} N/m (2) 3.0 × 10^{-2} N/m

(3) 6.0 × 10^{-2} N/m (4) 11.0 × 10^{-2} N/m

25. An aeroplane of mass 3 × 10^4 kg and total wing area 120 m^2 is in level flight at some height. The difference in pressure between upper and lower surfaces in kilopascal is (g = 10 m/s^2)

(1) 2.5 (2) 5.0

(3) 10.0 (4) 15.0

26. The volume thermal expansion coefficient of an ideal gas at constant pressure is

(1) $\frac{1}{V}$ (2) $\frac{1}{T}$

(3) $\frac{1}{P}$ (4) $\frac{P}{T}$

27. In an isobaric process of an ideal gas, the ratio of heat supplied to work done by system is

(1) 1 (2) $\frac{\gamma}{\gamma-1}$

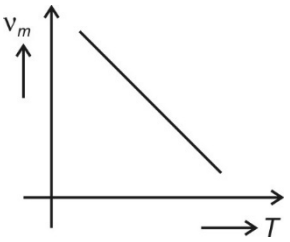
(3) $\frac{\gamma-1}{\gamma}$ (4) γ

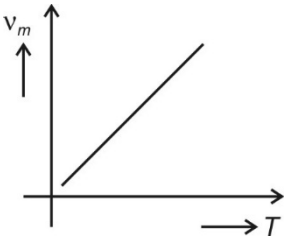
28. An ideal gas engine operates in carnot cycle between tempratures 227°C and 127°C. It absorbs 6 × 10^4 cals of heat from high temperature. The amount of heat converted into work is

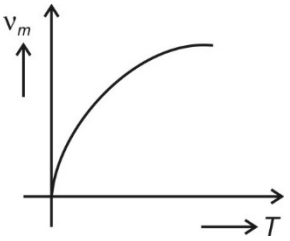
(1) 4.8 × 10^4 cal (2) 2.4 × 10^4 cal

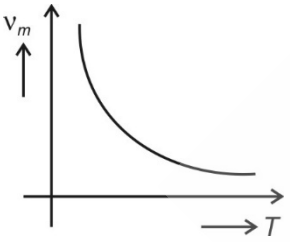
(3) 3.6 × 10^4 cal (4) 1.2 × 10^4 cal

29. Which of the following is the frequency (ν_m) of maximum intensity emitted v/s absolute temperature graph for a perfect black body?

(1) 

(2) 

(3) 

(4) 

30. Which of the following is not true for the progressive wave $y = 4\sin 2\pi\left(\frac{t}{0.02} - \frac{x}{100}\right)$ where x and y are in cm and t in second?
(1) Amplitude of wave is 4 cm
(2) The wavelength of wave is 100 cm
(3) The frequency of wave is 50 Hz
(4) The velocity of wave propagation is 2 cm/s

31. The wavelengths of 60 cm and 61 cm, produces 9 beats/ second. The velocity of sound is (approximately)
(1) 330 m/s (2) 335 m/s
(3) 340 m/s (4) 325 m/s

32. An object lies at the bottom of a salt water lake $\left(\mu = \sqrt{2}\right)$ at a depth of 10 m. For the object to be visible to an observer in a boat on the surface, the maximum horizontal distance of the boat from the object is
(1) 10 m (2) 20 m
(3) 14 m (4) 7 m

33. A ray of light is incident at an angle of incidence of 60° on the face of a prism having prism angle of 30°. The ray emerging out of the prism makes an angle of 30° with the incident ray. The refractive index of material of prism is
(1) $\sqrt{2}$ (2) $\sqrt{3}$
(3) 1.5 (4) 1.6

34. The focal length of objective and eye lenses of a telescope are respectively 200 cm and 5 cm. The maximum magnifying power of telescope is
(1) – 40 (2) – 48
(3) – 60 (4) – 100

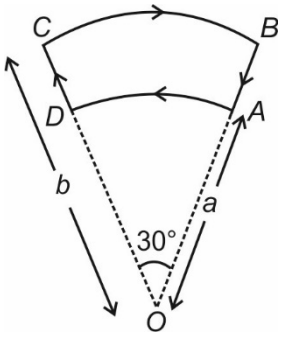
35. In Young's double slit experiment, the third bright fringe for light of wavelength 600 nm coincides with the fourth bright fringe for another source of light in same arrangement. The wavelength of second light source is
(1) 360 nm (2) 400 nm
(3) 450 nm (4) 550 nm

36. The axis of two polaroids are crossed. If now one of them is rotated through 30° and unpolarised light of intensity I_0 is incident on first polaroid, then intensity of transmitted light is
(1) $\frac{I_0}{4}$ (2) $\frac{3I_0}{4}$
(3) $\frac{3I_0}{8}$ (4) $\frac{I_0}{8}$

37. A conducting sphere of radius 20 cm is given a charge of 20 μC. The electric potential at a point at distance 5 cm from centre is
(1) 9×10^5 V (2) 1.8×10^6 V
(3) 9×10^6 V (4) 4.5×10^5 V

38. You are given four capacitors each of capacitance 12 μF. How can you connect the given capacitors to obtain a capacitance of 9 μF.
(1) All in series
(2) Two in parallel and other two in series
(3) Three in series and one in parallel with them
(4) Three is parallel one in series

39. A loop *ABCD* carries a current *I*. The angle made by *AB* and *CD* at origion *O* is 30°. The magnitude of magnetic field due to loop *ABCD* at origin is



(1) Zero (2) $\frac{\mu_0 I(b-a)}{24\,ab}$

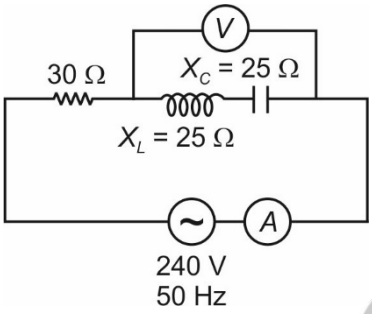
(3) $\frac{\mu_0 I}{4\pi}\left(\frac{b-a}{ab}\right)$ (4) $\frac{\mu_0 I}{6}\left(\frac{b-a}{ab}\right)$

40. Substance in which magnetic moment of a single atom and specimen both are zero, in the absence of magnetising field are known as

(1) Paramagnetic (2) Ferromagnetic

(3) Diamagnetic (4) Both 1 and 2

41. In the given circuit shown in figure. The voltmeter and ammeter readings are respectively (reactance are indicated in figure)



(1) 0 V, 3 A (2) 0 V, 8 A

(3) 0 V, $8\sqrt{16}$ A (4) $150\sqrt{2}$ V, $8\sqrt{2}$ A

42. A proton and an α-particle are having through the same kinetic energy. The ratio of their de-Broglie wavelength $\left(\frac{\lambda_P}{\lambda_\alpha}\right)$ is

(1) 1 : 1 (2) $\sqrt{2}$: 1

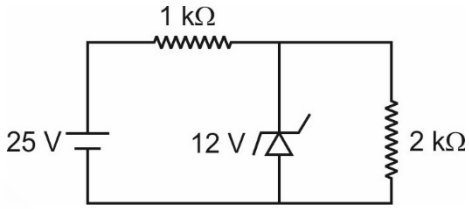
(3) 2 : 1 (4) 4 : 1

43. 200 g of a radioactive substance of half life 2 hour is taken. The amount of substance left after 10 hour is

(1) 3.125 g (2) 6.25 g

(3) 12.5 g (4) 25.0 g

44. In the given circuit current through the zener diode, of break down voltage of 12 V is



(1) 6 mA

(2) 4 mA

(3) 7 mA

(4) 10 mA

45. In semiconductor diode, the barrier potential offers opposition to flow of

(1) Majority charge carriers in both regions

(2) Minority charge carriers in both, regions

(3) Both majority and minority charge carriers

(4) Neither majority charge carrier, nor minority charge carrier

CHEMISTRY

46. Which among the following species is pyramidal in shape?

(1) BCl_3 (2) ClF_3

(3) PCl_3 (4) SF_4

47. If a particle of mass 500 mg is moving with a velocity of 100 m/s then the de-Broglie wavelength of the particle will be

(h = 6.625 $\times 10^{-34}$ Js)

(1) 1.325 $\times 10^{-35}$ m (2) 1.325 $\times 10^{-32}$ m

(3) 1.32 $\times 10^{-34}$ m (4) 1.32 $\times$ 10^{-31} m

48. Which among the following elements shows diagonal relationship with beryllium?

(1) Na (2) Li

(3) Al (4) Si

49. Maximum number of electrons present in *d* subshell is

(1) 2 (2) 6

(3) 10 (4) 5

50. The species which does not exist is

(1) H_2^+ (2) Be_2

(3) O_2^- (4) N_2^+

51. Glucose does not react with which of the following reagents?

(1) NH_2OH (2) Br_2/water

(3) $NaHSO_3$ (4) Acetic anhydride

52. Pair of compounds which cannot be distinguished by I_2/NaOH is

(1) Benzaldehyde and acetaldehyde

(2) Acetone and Ethanol

(3) Benzophenone and Acetophenone

(4) Propan-2-ol and Propan-1-ol

53. Ratio of rate of diffusion of H_2 and O_2 under identical condition of temperature and pressure will be

(1) 16 : 1 (2) 8 : 1

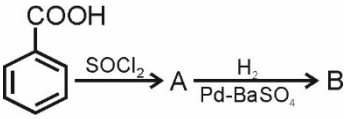
(3) 4 : 1 (4) $2\sqrt{2}$: 1

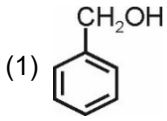
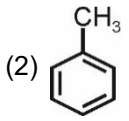
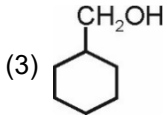
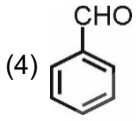
54. The gas which is most easy to liquify is
(1) CH_4 (2) NH_3
(3) H_2 (4) CO_2

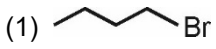
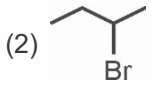
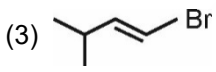
55. pH of 0.2 M sodium phenoxide solution will be (pK_a of phenol = 9.95)
(1) 8.2 (2) 9.3
(3) 10.4 (4) 11.6

56. Which among the following is a Lewis base?
(1) B_2H_6 (2) $AlCl_3$
(3) H_2O (4) $FeCl_3$

57. Consider the following reaction

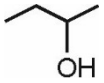
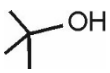
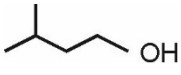


Product B is
(1) 
(2) 
(3) 
(4) 

58. The alkyl halide which react fastest by S_N1 mechanism is
(1) 
(2) 
(3) 
(4) 

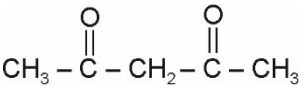
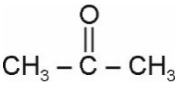
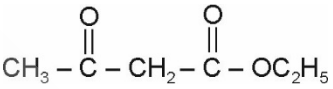
59. In the Haber process of synthesis of ammonia 28 g of N_2 is mixed with 10 g of hydrogen molecules. Maximum number of moles of ammonia produced in the reaction is
(1) 0.5 (2) 1.5
(3) 3.5 (4) 2

60. Molality of urea in an aqueous solution is 5. Mass percentage of urea in the solution is
(1) 12.2% (2) 23%
(3) 32.2% (4) 18%

61. Which alcohol on reaction with Cu at 573 K gives ketone as major product?
(1) 
(2) 
(3) 
(4) 

62. Condensation polymer among the following is
(1) Teflon (2) Orlon
(3) Nylon 6, 6 (4) Buna-N

63. Incorrect statement among the following is
(1) Proline is a non-essential amino acid
(2) Glycine is an optically inactive molecule
(3) Myosin is fibrous protein
(4) Insulin has fibre-like structure

64. The compound which has maximum enol content is
(1) CH_3CHO
(2) 
(3) 
(4) 

65. Aromatic species among the following is
(1) 
(2) 
(3) 
(4) 

66. Consider the following reaction

$$Ph-CH=CH_2 \xrightarrow{H_3O^+} A(Major) \xrightarrow[(ii)\,H_3O^+]{(i)\,I_2/NaOH} B + C$$

Product B and C are
(1) Ph-COOH and CHI_3
(2) $PhCH_2OH$ and CHI_3
(3) Ph–CHO and CHI_3
(4) $PhCH_2I$ and HCOOH

67. Oxidation state of phosphorous in hypophosphorous acid is
(1) +3 (2) +1
(3) +4 (4) +5

68. Strongest acidic nature among the following is of
(1) H_2Se (2) H_2O
(3) H_2S (4) H_2Te

69. H_3PO_3 on heating gives
(1) H_3PO_4 (2) PH_3
(3) H_3PO_2 (4) Both (1) and (2)

70. Which gas is evolved when Zinc reacts with dilute nitric acid?
(1) NO_2 (2) NO
(3) N_2O (4) N_2

71. Which among the following is a tranquilizer?
(1) Equanil (2) Ranitidine
(3) Dimetapp (4) Aspirin

72. The metal ion which is colourless in aqueous medium is
(1) Sc^{3+} (2) Cr^{3+}
(3) Fe^{3+} (4) Co^{3+}

73. Which coordination complex is diamagnetic in nature?
(1) $[Mn(Cl)_6]^{3-}$ (2) $[Fe(CN)_6]^{3-}$
(3) $[Co(C_2O_4)_3]^{3-}$ (4) $[CoF_6]^{3-}$

74. Strongest field ligand among the following is
(1) I^- (2) $\bar{O}H$
(3) $\bar{C}N$ (4) NH_3

75. Moles of $C_2O_4^{2-}$ ion oxidised by 2 moles of permanganate ion in acidic medium is
(1) 10 (2) 7
(3) 5 (4) 3

76. Approximate percentage of lanthanoids in mischmetall is
(1) 75% (2) 25%
(3) 50% (4) 95%

77. Correct order of electron affinity of O, S, Se and Te is
(1) O > S > Se > Te (2) S > Se > Te > O
(3) Te > Se > S > O (4) S > O > Se > Te

78. 18 g of glucose is dissolved in 250 g of water. The freezing point of the solution will be (K_f of water = 1.86 K kg mol^{-1})
(1) –1.8°C (2) –0.6°C
(3) –1.2°C (4) –0.74°C

79. Packing fraction of body centred cubic structure is
(1) $\frac{\pi}{6}$ (2) $\frac{\sqrt{3}}{8}\pi$
(3) $\frac{\sqrt{2}}{8}\pi$ (4) $\frac{\sqrt{3}}{6}\pi$

80. If conductivity of 0.01 M KCl solution is 0.0015 S cm^{-1} then the molar conductivity of the solution will be
(1) 15 S cm^2 mol^{-1}
(2) 150 S cm^2 mol^{-1}
(3) 1.5×10^3 S cm^2 mol^{-1}
(4) 1.5 S cm^2 mol^{-1}

81. Which metal will not liberate hydrogen when reacted with dilute H_2SO_4
(1) Zn (2) Al
(3) Ca (4) Au

82. If Rate constant of a chemical reaction is 4.606×10^{-3} s^{-1} then the time required for the completion of 90% of the reaction is
(1) 200 s (2) 300 s
(3) 400 s (4) 500 s

83. Incorrect statement among the following is
(1) A catalyst does not change the equilibrium constant of a reaction
(2) A catalyst alters Gibbs energy, ΔG of a reaction
(3) Order of a reaction is an experimental quantity
(4) For complex reaction molecularity has no meaning

84. As_2S_3 sol is most easily precipitated by which ion?
(1) Al^{3+} (2) PO_4^{3-}
(3) Ba^{2+} (4) SO_4^{2-}

85. The metal which is refined by distillation is
(1) Zn (2) Ni
(3) Zr (4) Ti

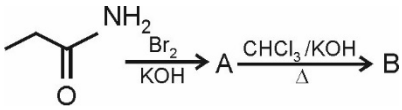
86. Which is most easily soluble in water
(1) $MgSO_4$ (2) $CaSO_4$
(3) $BaSO_4$ (4) $SrSO_4$

87. When Aluminium carbide reacts with D_2O then the product formed is
(1) C_2D_2 (2) CD_4
(3) C_2D_4 (4) C_2D_6

88. Hybridisation of carbon in graphite is/are
(1) sp^2 (2) sp
(3) sp^3 (4) Both (1) and (3)

89. 2 mole of an ideal gas undergo isothermal and reversible expansion from 2 litre to 20 liltre at 127°C the work done by the gas is
(1) –25.2 kJ (2) –15.3 kJ
(3) –7.5 kJ (4) –35.1 kJ

90. Consider the following reaction sequence



Product B is
(1) CH_3CH_2CN (2) $CH_3CH_2CH_2CN$
(3) CH_3CH_2NC (4) $CH_3CH_2CH_2NC$

BOTANY

91. Which type of ribosome is present in a typical mammalian mitochondria?
(1) 70 S (2) 80 S
(3) 60 S (4) 40 S

92. Which of the given plastids store fats and oils?
(1) Amyloplast (2) Aleuroplast
(3) Chloroplast (4) Elaioplast

93. In which stage of mitosis, shape of chromosomes is best studied?
(1) Prophase (2) Metaphase
(3) Anaphase (4) Telophase

94. Select the **incorrect** statement w.r.t. 'Interkinesis'
(1) Is a metabolic phase between telophase I and prophase-II
(2) Chromosomes form chromatin fibre during this phase
(3) There is no replication of DNA during this phase
(4) RNA and protein required during meiosis II are synthesized

95. Which of the given is **not** a defining property of living organisms?
(1) Growth (2) Metabolism
(3) Cellular organization (4) Consciousness

96. Select the **incorrect** match w.r.t. the given taxonomic categories of wheat.
(1) Genus - *Triticum*
(2) Family - *aestivum*
(3) Order- Poales
(4) Class - Monocotyledonae

97. The disease 'sleeping sickness' is caused due to a member of which of the given groups of protozoan?
(1) Amoeboid protozoan
(2) Flagellated protozoan
(3) Ciliated protozoan
(4) Plantae

98. The cell wall resembles a soap box in organism of which of the given kingdom according to Whittaker's classification system?
(1) Monera (2) Protista
(3) Fungi (4) Plantae

99. Bilateral symmetry is found in the flower of
(1) *Cassia* (2) Mustard
(3) Canna (4) Chilli

100. Select the **incorrect** match
(1) Opposite phyllotaxy - *Calotropis*
(2) Parallel venation - Banana
(3) Whorled phylotaxy - *Nerium*
(4) Alternate phyllotaxy - Guava

101. The shoot axis continue to grow indefinitely and the flowers are borne in an acropetal succession is seen in
(1) *Begonia* (2) *Solanum*
(3) Mustard (4) Teak

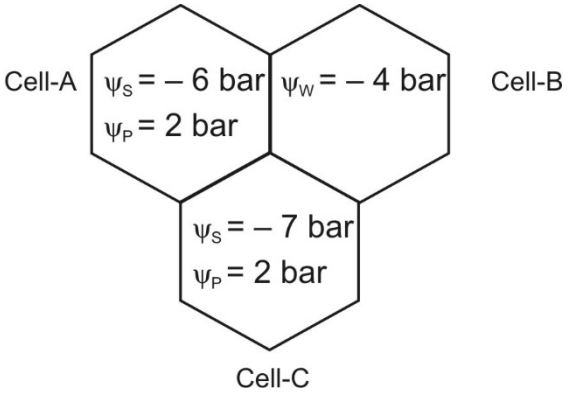
102. The study of internal structures of organisms is called
(1) Morphology (2) Anatomy
(3) Physiology (4) Ecology

103. The apical meristem performs all of the given functions, **except**
(1) Produces the primary tissues of the plant body
(2) Responsible for primary growth of the plant
(3) Growth of roots and stem in length
(4) Produces cork

104. Colonial algae is
(1) *Volvox* (2) *Ulothrix*
(3) *Spirogyra* (4) Kelps

105. Double fertilization is an unique event to
(1) Alage (2) Gymnosperm
(3) Angiosperm (4) Pteridophyte

106. A hypothetical arrangement of plant cells (A, B and C) is given below.



Select the **correct** statement w.r.t. arrangement of given plant cells
(1) There is irreversible flow of water between cell-A and cell-B
(2) The medium in cell-C is more concentrated than cell-B

(3) Net flow of water is zero between cell-C and cell-B

(4) Direction of flow of water is from cell-C to cell-A

107. The process of absorption of water by hydrophilic solid particles of a substance without forming a solution is called

(1) Imbibition (2) Plasmolysis

(3) Guttation (4) Osmosis

108. Deficiency of which of the given groups of elements causes necrosis?

(1) Ca, Mg, Cu (2) N, S, Fe

(3) N, S, Mo (4) K, S, Mo

109. Which of the given bacteria is autotrophic, free living as well as symbiotic nitrogen fixer?

(1) *Rhizobium* (2) *Frankia*

(3) *Anabaena* (4) *Azotobacter*

110. Which of the given is primary CO_2 aceptor in C_3 plants?

(1) RuBP (2) PEP

(3) PGA (4) OAA

111. The reaction centre w.r.t. cyclic photophosphorylation is

(1) P_{700} (2) P_{680}

(3) P_{540} (4) P_{660}

112. Which of the given steps of EMP pathway is catalyzed by phosphofructokinase (PFK)?

(1) Glucose → Glucose-6-Phosphate

(2) Glucose-6-phosphate → Fructose-6-phosphate

(3) Fructose-6-phosphate → Fructose-1,6-bisphosphate

(4) Fructose-1,6-bisphosphate → Glyceraldehyde-3-phosphate

113. Which of the given has maximum respiratory quotient (RQ) under aerobic respiration?

(1) Proteins (2) Fats

(3) Oxalic acid (4) Malic acid

114. Select the **incorrect** match

(1) *Penicillium* - conidia

(2) *Chlamydomonas* - Zoospore

(3) *Spirogyra* – Binary fission

(4) Yeast - Budding

115. Select the **odd** one w.r.t. polycarpic plants

(1) Mango (2) Apple

(3) Orange (4) Marigold

116. The innermost layer of anther wall is

(1) Epidermis (2) Endothecium

(3) Middle layer (4) Tapetum

117. Largest cell in embryo sac of angiosperm is

(1) Synergid cell (2) Egg

(3) Antipodal cell (4) Central cell

118. How many linkage groups are present in human female?

(1) 24 (2) 23

(3) 22 (4) 2

119. How many gametes can be produced by a diploid organism, if it is heterozygous for 4 loci?

(1) 8 (2) 4

(3) 16 (4) 5

120. Which of the given hormones is used to produce parthenocarpic or seedless banana and tomatoes?

(1) Auxin (2) Cytokinin

(3) Abscisic acid (4) Kinetin

121. Match column-I with column-II and select the **correct** option

	Column-I		**Column-II**
A.	RNA polymerase I	(i)	hn RNA
B.	RNA polymerase II	(ii)	tRNA
C.	RNA polymerase III	(iii)	5.8 S, 18 S, 28 S rRNA

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

122. Calculate the number of nucleosome present in the nucleus of diploid eukaryotic cell which possess 3.3×10^9 bp

(1) 3.3×10^9 (2) 3.3×10^7

(3) 1.65×10^9 (4) 1.65×10^7

123. If a dsDNA molecule has 3000 bp then what will be the number of N-glycosidic linkage in it?

(1) 3000 (2) 4000

(3) 6000 (4) 2988

124. Recovery of healthy plants from diseased plant is possible by

(1) Meristem culture

(2) Somatic hybridisation

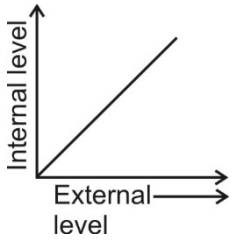
(3) Protoplast fusion

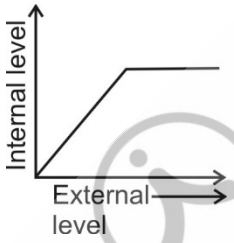
(4) Callus culture

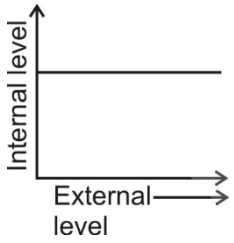
125. Himgiri is bred by hybridization and selection for disease resistance to leaf and stripe rust is a variety of which of the given crop?
(1) Wheat (2) *Brasssica*
(3) Cowpea (4) Chilli

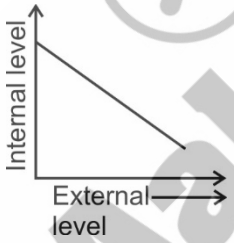
126. Select the **incorrect** match
(1) Cyclosporin A – *Trichoderma polysporum*
(2) Statins – *Streptococcus*
(3) Amylase – *Aspergillus*
(4) Acetic acid – *Acetobacter aceti*

127. The major component of biogas is
(1) CH_4 (2) CO_2
(3) H_2 (4) H_2S

128. Find out the **correct** diagrammatic representation of organismic response w.r.t. conformers.
(1) 

(2) 

(3) 

(4) 

129. Epiphytes growing on mango is an example of which type of the given population interaction?
(1) Competition (2) Protocooperation
(3) Commensalism (4) Mutualism

130. Read the given statements stating true (T) and false (F) and select the **correct** option.
A. Anthropogenic ecosystem possess self regulatory mechanism
B. Forest is a natural ecosystem
C. Estuaries is a terrestrial ecosystem

	A	B	C
(1)	T	T	F
(2)	F	T	F
(3)	F	F	T
(4)	T	F	F

131. Which of the given is/are among the most productive ecosystem?
(1) Coral reefs
(2) Sugarcane field
(3) Desert
(4) Both (1) and (2)

132. The historic convention on biological diversity (The earth summit) held in A in B .
(1) A-Rio de Janeiro, B-1992
(2) A-Johannesburg, B-2002
(3) A-Rio de Janerio, B-2002
(4) A-Johannesburg, B-1992

133. The most important cause driving animals and plants to extinction is
(1) Over exploitation
(2) Habitat loss and fragmentation
(3) Alien species invasion
(4) Co-extinction

134. Biomagnification will be maximum among which of the given trophic level in an aquatic ecosystem?
(1) T_1
(2) T_2
(3) T_3
(4) T_4

135. Match column-I with column-II w.r.t. pollutants and their effect

Column-I	Column-II
A. Carbon monoxide	(i) Phaeophytization in lichens
B. Sulphur dioxide	(ii) Heart and lung problems
C. NO_x	(iii) Reduces O_2 carrying capacity of the blood
D. Hydrocarbon	(iv) Cancer

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

ZOOLOGY

136. The enzyme that seals 5' PO_4 and 3' OH polynucleotide ends while creating a recombinant DNA molecule is
(1) Alkaline phosphatase
(2) DNA ligase
(3) DNAse
(4) Restriction endonuclease

137. Part of a plasmid such as pBR322 responsible for controlling the copy number of the linked alien DNA is
(1) *Ori* (2) *rop*
(3) amp^R (4) tet^R

138. DNA from *Agrobacterium tumefaciens* can be extracted through use of enzyme
(1) Chitinase (2) Cellulase
(3) Lysozyme (4) DNAse

139. Select the **incorrect** statement.
(1) Separation of DNA fragments occurs based on their size in agarose gel.
(2) Blue-white selection involves insertional inactivation of β-galactosidase.
(3) Treatment with ice-cold calcium can enhance efficiency of transformation in host cells.
(4) Extension step during PCR is based on thermolabile nature of *Taq* polymerase.

140. Select the **correct** match
(1) Genetically engineered insulin – Lacks disulfide bonds between chain A and B
(2) Glyphosate – Systemic herbicide used to kill weeds
(3) RNA interference technique – Utilised to create Bt cotton and Bt corn
(4) First transgenic sheep, Rosie – Produced milk rich in human α-lactalbumin

141. Which of the following is a product of cross breeding?
(1) Mule (2) Jersey
(3) Leghorn (4) *Hisardale*

142. Select the term **not** associated with MOET.
(1) Artificial insemination
(2) *In-vitro* fertilisation
(3) Super ovulation
(4) Embryo transfer

143. Retrovirus among following is
(1) Corona virus (2) Ebola virus
(3) Herpes simplex (4) HIV virus

144. Select the option that completes the given analogy
Pneumonia : *Streptococcus pneumoniae* : : Typhoid : _____
(1) *Plasmodium falciparum*
(2) *Haemophilus influenzae*
(3) *Salmonella typhi*
(4) *Wuchereria bancrofti*

145. Select the **incorrect** match
(1) Biological response modifiers – α-interferon
(2) Insomnia – Benzodiazapines
(3) *Cannabis sativa* – Smack
(4) Metastasis – Malignant neoplasma

146. Passive immunity through administration of pre-formed antibodies is exemplified by all **except**
(1) Colostrum
(2) Tetanus toxoid vaccine
(3) Anti-tetanus serum
(4) IgG crossing placental barrier

147. Read the given statements
Statement A : Histamine is a potent vasodilator released from mast cells during an allergic reaction.
Statement B : Memory based acquired immunity evolved in vertebrates.
Select the **correct** option.
(1) Only statement A is correct.
(2) Only statement B is correct.
(3) Both statements A and B are incorrect.
(4) Both statements A and B are correct.

148. Cave paintings by prehistoric humans can be seen at Bhimbetka rock shelter in Raisen district of
(1) Uttar Pradesh (2) Madhya Pradesh
(3) Maharashtra (4) Gujarat

149. Possibly direct descendents of *Psilophyton* include all **except**
(1) Herbaceous lycopods
(2) Gnetales
(3) Conifers
(4) Gingkos

150. Which type of natural selection is said to have occurred when more individuals acquire peripheral character value at both ends of the distribution curve?
(1) Stabilising selection (2) Balancing selection
(3) Disruptive selection (4) Directional selection

151. Factor whose absence can disrupt the Hardy Weinberg equilibrium in a large population is
(1) Natural selection (2) Random mating
(3) Gene flow (4) Gene recombination

152. Examples of phenomenon named adaptive radiation is **not** seen in/amongst
(1) Marsupials in Australia
(2) Finches on Galapagos islands
(3) Dark and light moths *w.r.t.* industrial melanism
(4) Structure of limbs for locomotion in mammals

153. Select the **correct** match between column I and column II

	Column I		**Column II**
(i)	Theory of Panspermia	p.	Paleontological evidences
(ii)	Big Bang theory	q.	Origin of life on Earth
(iii)	Miller's electric discharge experiment	r.	Origin of Earth
(iv)	Fossil remnants	s.	Origin of Universe
		t.	Formation of amino acids

Code

	(i)	(ii)	(iii)	(iv)
(1)	r	q	p	s
(2)	r	s	t	p
(3)	q	r	p	t
(4)	q	s	t	p

154. Which among the following can be cured if detected early and treated properly?
(1) Syphilis (2) Hepatitis-B
(3) Genital herpes (4) HIV infections

155. Mode of action of IUDs does **not** involve
(1) Phagocytosis of sperms in uterus
(2) Inhibiting implantation
(3) Inhibiting deposition of sperms in vagina
(4) Altering the quality of cervical mucus

156. How many sex chromosomes does a normal human baby inherit from father?
(1) One (2) Two
(3) Twenty three (4) Forty six

157. Read the given statements.
(a) Decline in LH leads to regression of corpus luteum in a pregnant female
(b) Saheli acts as selective estrogen receptor modulator
(c) Secretions from acrosome of ootid results in fertilisation
(d) Level of gonadotrophins increase markedly upon removal of ovaries
How many of the above statements are **correct**?
(1) One (2) Three
(3) Two (4) Four

158. Ploidy levels are similar in
(1) Oogonia, primary oocyte
(2) Spermatid, primary spermatocyte
(3) 1st polar body, spermatogonia
(4) 2nd polar body, spermatogonia

159. Chromosome number in gamete of housefly is 'x' while chromosome number in meiocytes of fruit fly 'y'.
Select the **correct** option in context of 'x' and 'y'.

	'x'	'y'
(1)	12	16
(2)	6	8
(3)	12	4
(4)	16	12

160. Read the given features
(a) Presence of cnidoblasts
(b) Alternation of generation
(c) Extracellular and intracellular digestion
All of the above given characters are observed in
(1) *Hydra* (2) *Physalia*
(3) *Meandrina* (4) *Adamsia*

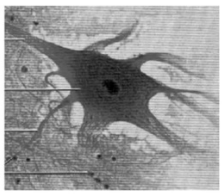
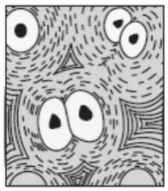
161. Which of the following is a **correct** match w.r.t. members listed and corresponding taxon?
(1) Earthworm, silkworm, hookworm – Annelida
(2) Sea hare, sea lily, sea urchin – Echinodermata
(3) Cuttle fish, devil fish, apple snail – Mollusca
(4) Sea horse, flying fish, dog fish – Chondrichthyes

162. Select the **incorrect** option w.r.t. animal listed in column A and features exhibited in column B

	Column A (Organism)	Column B (Features)
(1)	*Psittacula*	Homeothermy, Air sacs to supplement respiration
(2)	*Panthera tigris*	Viviparity, Thecodont dentition
(3)	*Pleurobrachia*	Bioluminescence, Eight rows of ciliated comb plates
(4)	*Pristis*	Presence of operculum, Absence of air bladder

163. Among the options given below, simple epithelium is **not** found at which location?
(1) Air sacs of lungs
(2) PCT
(3) Inner surface of bronchioles and fallopian tubes
(4) Inner lining of ducts of salivary glands and pancreas

164. See the figures given below and select the **mismatch** w.r.t. identification or corresponding feature listed.

(1)		Voluntary, striated fibres exhibiting structural syncytium.
(2)		Cell body is rich in Nissl's granules
(3)		Fibres with gap junctions between adjacent cells
(4)		Intercellular material arranged in concentric lamellae and cells are found in lacunae.

165. Select the **correct** statement w.r.t. *Periplaneta americana*.
(1) Paurometabolous development with 9-10 nymphal stages.
(2) A pair of spermatheca is present in the 6th segment of only female cockroach.
(3) Anal styles present exclusively in males are attached to 10th tergite.
(4) Mesothoracic wings are opaque, dark and leathery in appearance and are used in flight.

166. Secretions from these help in digestion of food in cockroach. 'These' represents the
(1) Crop (2) Gizzard
(3) Hepatic caecae (4) Malpighian tubules

167. Category of aromatic amino acids include all **except**
(1) Serine (2) Tyrosine
(3) Phenylalanine (4) Tryptophan

168. Select the **incorrect** statement.
(1) Dietary proteins are the source of essential amino-acids.
(2) Concanavalin A is a lectin and is considered a secondary metabolite
(3) Cellulose, inulin, starch and glycogen are homopolymers of glucose
(4) Phosphodiester bonds are a characteristic feature of both RNA and DNA

169. Carboxypeptidase requires zinc as a cofactor for optimal functioning. It can be classified as a
(1) Transferase
(2) Lyase
(3) Ligase
(4) Hydrolase

170. Non-reducing sugar among following is
(1) Ribose (2) Deoxyribose
(3) Glucose (4) Sucrose

171. Select the option that represents **correct** combination of components of succus entericus.
(1) Lipase, nuclease, nucleotidase
(2) Enterokinase, lactase, nucleosidase
(3) Mucus, trypsinogen, pepsin
(4) Castle's intrinsic factor, sucrase, maltase

172. Select the **incorrect** option.

(1) Polysaccharides $\xrightarrow[\text{pH 6.8}]{\text{Amylase}}$ Disaccharides

(2) Paneth cells in mucosa of gut secrete lysozyme that has antibacterial effects.

(3) Mucus secreting goblet cells are present in submucosa of wall of alimentary canal.

(4) Vomiting is a reflex action controlled by the vomit centre in the medulla.

173. The partial pressure of O_2 and CO_2 in the systemic veins is same as that in

(1) Systemic arteries

(2) Pulmonary arteries

(3) Alveolar air

(4) Atmospheric air

174. How much CO_2 is delivered by 5 L of deoxygenated blood to alveoli?

(1) 250 ml

(2) 200 ml

(3) 750 ml

(4) 400 ml

175. Electrocardiograph records

(1) Potential difference across cells of myocardium

(2) Volume of blood pumped

(3) Ratio of systolic to diastolic blood pressure

(4) Electrical activity of Brain waves

176. This hormone promotes loss of sodium and water in urine, thereby increasing urinary output. This hormone is released from

(1) JG cells

(2) Liver

(3) Medulla

(4) Atrial walls of heart

177. Select the option that has the **correct** odd one w.r.t. parameter stated.

S.No.	Items	Parameter	Odd one
(1)	Ankle joint, elbow joint, knee joint, atlanto-occipital joint	Hinge joint	Atlanto-occipital joint
(2)	7^{th}, 8^{th}, 9^{th} & 10^{th} pair of ribs	Vertebrochondral ribs	10^{th} pair of ribs
(3)	Carpals, tarsals, femur, humerus	Appendicular skeleton	Humerus
(4)	Frontal, hyoid, sphenoid, temporal bones	Cranial bones	Sphenoid

178. In a healthy person, the red muscle fibres appear red due to stored

(1) Carboxyhemoglobin

(2) Carbaminohemoglobin

(3) Myoglobin

(4) Erythropoietin

179. Select the **correct** statement.

(1) All hormones from pituitary gland are non-steroidal.

(2) Hormones derived from amino acids including epinephrine and thyroxine both of which do not require extracellular receptors.

(3) CCK targets exocrine and endocrine part of pancreas to stimulate secretion of water, bicarbonate ions and hormones.

(4) Progesterone is called ovulatory hormone and it supports pregnancy.

180. Diseases caused due to insufficiency of hormones include all **except**

(1) Cushing's disease (2) Addison's disease

(3) Cretinism (4) Diabetes insipidus

❑ ❑ ❑

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