Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)

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Time : 3 Hrs. **MM : 720**

MOCK TEST
for
NEET-2019

GENERAL INSTRUCTIONS :

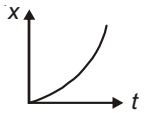
1. This paper consists of 180 objective type questions from Physics, Chemistry and Biology (Botany & Zoology).
2. For each correct response 4 marks will be awarded, whereas for each incorrect response 1 mark will be deducted from the total score.
3. No deduction from the total score will be made if no response is indicated.
4. More than one answer will be negatively marked.
5. Use Blue/Black ballpoint pen only to darken the appropriate circle.
6. Mark should be dark and should completely fill the circle in the answer sheet.
7. Do not use white-fluid or any other rubbing material on answer sheet. No change in the answer once marked.
8. Rough work must not be done on the answer sheet.
9. Student cannot use log tables and calculators or any other material in the examination hall.

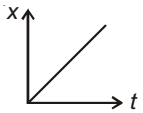
PHYSICS

Choose the correct answer :

1. In a radiation with energy $E = hf$, where f is frequency and h is Planck's constant, the dimensions of h are same as that of
   (1) Angular momentum
   (2) Angular impulse
   (3) Both (1) & (2)
   (4) Angular frequency

2. In which of the following position-time (x - t) graphs, the average velocity in the interval 0 to t can be zero?

   (1) 

   (2) 

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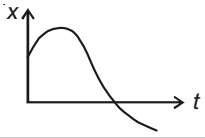
   (4) 

3. At a metro station, a boy walks up a stationary escalator when the escalator is moving in time T_1. If he remains stationary on the escalator, then the escalator takes him up in T_2. The time taken by him to walk up the moving escalator will be

   (1) $\frac{T_1T_2}{T_1+T_2}$ (2) $T_1 + T_2$

   (3) $\frac{T_1+T_2}{2}$ (4) $\sqrt{T_1T_2}$

4. A man crosses a river perpendicular to the river flow in time t seconds and travels an equal distance down the stream in T seconds. The ratio of man's speed in still water to the speed of river water will be

   (1) $\frac{t^2-T^2}{t^2+T^2}$ (2) $\frac{T^2-t^2}{T^2+t^2}$

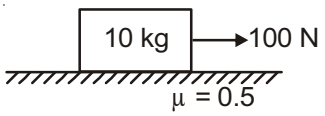
   (3) $\frac{t^2+T^2}{t^2-T^2}$ (4) $\frac{T^2+t^2}{T^2-t^2}$

5. The horizontal range of a projectile fired at an angle of 15° with horizontal is 20 m. If it is fired with the same speed at an angle of 45° with horizontal, then its range will be

(1) 30 m (2) 40 m

(3) 50 m (4) 60 m

6. Find the minimum force that must be applied on the block vertically so that the block does not move



(1) 70 N (2) 80 N

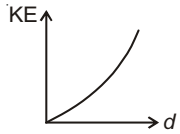
(3) 50 N (4) 100 N

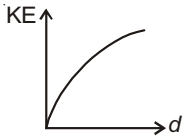
7. A body of mass 3 kg experiences a force $\vec{F} = (2\hat{i} + 2\hat{j})$ N. If its initial velocity $\vec{v} = (-8\hat{i} + 4\hat{j})$ m/s, then the time at which it will have a velocity just along the *y*-axis is

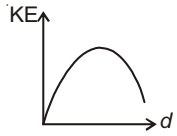
(1) 12 s (2) 10 s

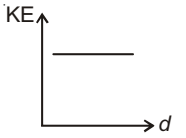
(3) 8 s (4) 4 s

8. Which of the following graphs correctly shows the variation in kinetic energy (KE) of a metal sphere falling freely in a lake? Assume sufficient depth of the lake to impart terminal velocity to the sphere (*d* is depth)

(1) 

(2) 

(3) 

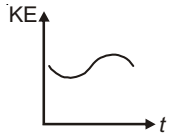
(4) 

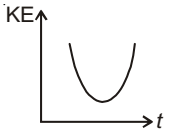
9. A mass of 2 kg is moving on a circular path of radius 2 m at 30 revolution per minute. The kinetic energy of the mass (in joule) is

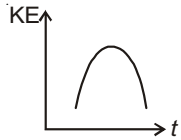
(1) π^2 (2) $2\pi^2$

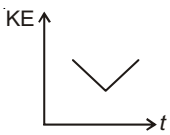
(3) $4\pi^2$ (4) $8\pi^2$

10. Which of the following graphs closely represents the variation in kinetic energy of a planet as it moves once round the sun in its elliptical orbit? (*t* is time)

(1) 

(2) 

(3) 

(4) 

11. An electron and a proton are moving under mutual attractive forces. For calculating the change in kinetic energy of the system during motion, the magnetic force of one another is neglected because the magnetic forces

(1) Are equal and opposite

(2) Do no work

(3) Do equal and opposite work

(4) Both (1) & (3)

12. When a hollow sphere rotates with uniform angular velocity about its diameter then the incorrect statement is that the

(1) Speed of rotation is non-zero and remains same

(2) Angular acceleration is non-zero and remains same

(3) Orientation of the axis of rotation remains same

(4) Sense of rotation remains same

13. The linear mass density of a non-uniform rod of length 1 m is given by $\rho(x) = 1 + Ax^2$, where *A* is constant and $0 \le x \le 1$. The centre of mass of the rod will be at

(1) $\frac{3(2+A)}{4(3+A)}$ (2) $\frac{2(2+A)}{3(3+A)}$

(3) $\frac{4(2+A)}{3(3+A)}$ (4) $\frac{3(2+A)}{2(3+A)}$

14. According to Kepler, the period of revolution of a planet (*T*) and its mean distance from the sun (*r*) are related by the equation

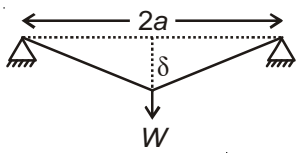
(1) T^2r = constant

(2) T^2r^3 = constant

(3) T^2r^{-3} = constant

(4) T^2r^2 = constant

15. A copper rod of length 2*a* and cross-sectional area *A* is stretched within elastic limit, horizontally between two supports as shown. A load *W* is suspended at the mid point which produces a very small depression δ. If $\delta << a$, then the strain in the rod is



(1) $\frac{\delta}{a}$ (2) $\frac{\delta^2}{a^2}$

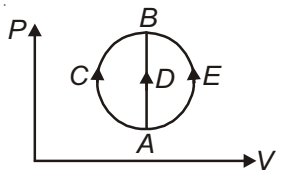
(3) $\frac{\delta^2}{2a^2}$ (4) $\frac{\delta}{2a}$

16. If $\vec{A}\cdot\vec{B}=|\vec{A}\times\vec{B}|$, then $|\vec{A}+\vec{B}|$ is equal to

(1) $\sqrt{A^2+B^2}$ (2) $A + B$

(3) $\sqrt{A^2+B^2+\frac{AB}{\sqrt{2}}}$ (4) $\sqrt{A^2+B^2+\sqrt{2}AB}$

17. One mole of an ideal gas is taken from state *A* to state *B* by three different processes (I) *ACB*, (II) *ADB* and (III) *AEB* as shown in the P-V diagram. The heat absorbed by the gas is



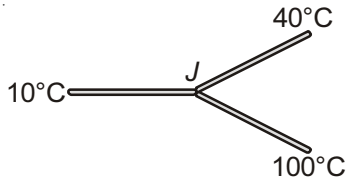
(1) Greater in process (II) then in (I)
(2) The least in process (II)
(3) The same in (I) and (III)
(4) Less in (III) then (II)

18. 30 gram ice at 0°C is mixed with 30 gram steam at 100°C. Final temperature of the mixture, assuming no heat loss to the surroundings, is (latent heat of condensation = 540 cal/g, latent heat of fusion = 80 cal/g, specific heat of water = 1 cal/g)

(1) 50°C (2) 100°C

(3) More than 100°C (4) 65°C

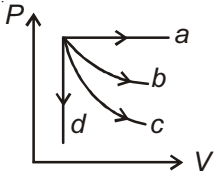
19. Three identical rods have been welded to form the shape of the letter *Y* as shown. The ends are maintained at temperature 10°C, 40°C and 100°C. Assuming one dimensional steady state conduction through a rod, the temperature of the junction *J* is



(1) 50°C (2) 60°C

(3) 70°C (4) 30°C

20. Four processes, viz., isothermal, adiabatic, isobaric and isochoric process have been shown on a pressure-volume (*P*-*V*) diagram. The isothermal process is



(1) *a* (2) *b*

(3) *c* (4) *d*

21. The sink temperature of a Carnot engine of 40% efficiency is at 300 K. For increasing the efficiency to 60%, the increase in the temperature of source temperature will be [Keeping temperature of sink constant]

(1) 200 K (2) 300 K

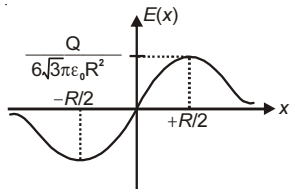
(3) 350 K (4) 250 K

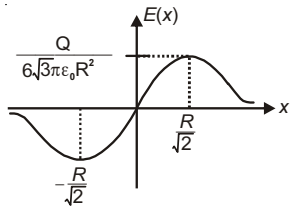
22. One mole of O_2 gas is contained in a box of volume V = 2 m^3 at pressure P_0 and temperature 300 K. The gas is now heated to 600 K and the molecules now get dissociated into oxygen atoms. The new pressure of the gas is

(1) P_0 (2) $2P_0$

(3) $4P_0$ (4) $8P_0$

23. Which of the following graphs shows the correct variation of electric field as function of *x* along the axis of a uniformly and positively charged ring of radius *R* and charge *Q*

(1)


(2)


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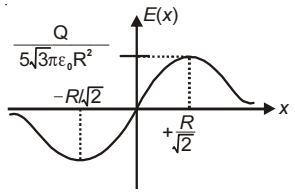

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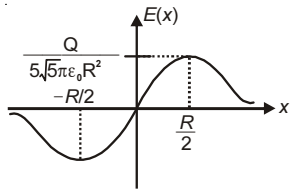


24. A particle undergoing SHM has a maximum speed of 30 cm/s and a maximum acceleration of 60 cm/s^2. The time period of oscillation (in second) is

(1) $\frac{\pi}{2}$ (2) 2π

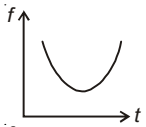
(3) π (4) 4π

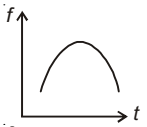
25. A uniform string of length L and mass M hangs freely from a fixed point. Then the velocity of transverse waves along the string at a distance x from the free end is

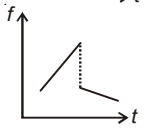
(1) $\sqrt{gL}$ (2) $\sqrt{gx}$

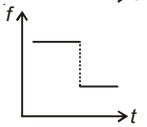
(3) gL (4) gx

26. A train whistling at constant frequency is moving towards a station at a constant speed. The train goes past a stationary observer on the station. The variation of frequency f of the sound as heard by the observer as a function of time t is best represented by

(1) 

(2) 

(3) 

(4) 

27. Which of the following statements is correct regarding electrostatics of conductors?

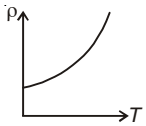
(1) The interior of a conductor can have no excess charge in the static situation

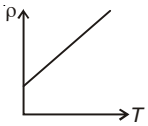
(2) Electrostatic potential is constant throughout the volume of the conductor

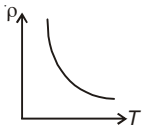
(3) Electrostatic potential has same value inside as that on its surface

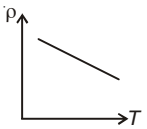
(4) All of these

28. Which of the following graphs correctly represents the temperature (T) dependence of resistivity (ρ) for a typical semiconductor?

(1) 

(2) 

(3) 

(4) 

29. A closely wound solenoid of 2000 turns and area of cross-section 1.6 cm^2 carries a current of 4 A. The magnetic moment associated with the solenoid (in Am^2) is

(1) 1.28 (2) 2.56

(3) 5.12 (4) 10.24

30. Choose the correct statement regarding magnetism.

(1) Paramagnetic sample displays greater magnetisation when cooled

(2) Diamagnetism is almost independent of temperature

(3) Ferromagnetic substances show hysteresis

(4) All of these

31. The true dip at a certain place is 30°. The apparent dip when the dip circle is turned 60° out of the magnetic meridian is

(1) $\sin^{-1}\left(\frac{2}{\sqrt{3}}\right)$ (2) $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

(3) $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$ (4) $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

32. A one metre long metallic rod is rotated with an angular frequency of 400 radian/s about an axis normal to the rod passing through its one end. The other end of the rod is in contact with a circular metallic ring. A constant uniform magnetic field of 0.5 tesla parallel to the axis exists everywhere. The emf developed between the centre and the ring is

(1) 200 V (2) 100 V

(3) 50 V (4) 1000 V

33. The value of quality factor (Q-value) of the series resonant circuit with inductance L = 2.0 H, capacitance C = 32 μF and resistance R = 10 Ω, is

(1) 25 (2) 250

(3) 0.25 (4) 2.5

34. The amplitude of the magnetic field part of a harmonic electromagnetic wave in vacuum is B_0 = 480 nT. The amplitude of the electric part of the wave (in N/C) is

(1) 14.4 (2) 144

(3) 16 (4) 1.6×10^{-15}

35. A compound microscope has an objective lens with a focal length of 1.5 cm and an eye piece of focal length 5 cm. It is focussed on an object which is at a distance of 1.8 cm from objective lens. The length of the microscope for normal adjustment is

(1) 14 cm (2) 4 cm

(3) 19 cm (4) 9.5 cm

36. In Young's double hole (slit) experiment using light of wavelength 6000 Å, the angular width of fringe formed on a distant screen is 0.1°. The slit separation is approximately

(1) 0.34 mm

(2) 0.34 cm

(3) 0.34 m

(4) 0.034 mm

37. The threshold frequency for a certain metal is 3.3×10^{14} Hz. If light of frequency 8.2×10^{14} Hz is incident on the metal, then the cut-off voltage for the photoelectric emission is approximately

(1) 6 V (2) 5 V

(3) 4 V (4) 2 V

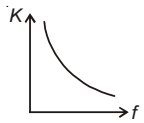
38. An electron beam has a kinetic-energy equal to 100 eV. The wavelength associated with the beam is approximately

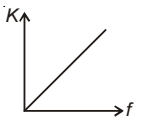
(Given, mass of electron = 9.1×10^{-31} kg, Planck's constant = 6.6×10^{-34} Js and 1 eV = 1.6×10^{-19} J)

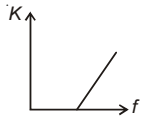
(1) 0.12 Å (2) 1.2 Å

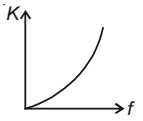
(3) 12 Å (4) 120 Å

39. The variation of maximum kinetic energy (K) of photoelectrons as a function of frequency (f) of the incident radiation is best shown by

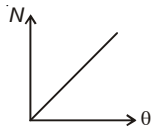
(1) 

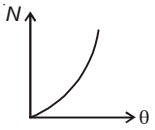
(2) 

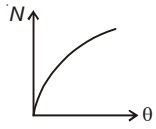
(3) 

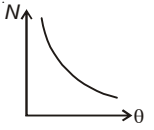
(4) 

40. The number (N) of scattered α-particles detected versus scattering angle (θ) graph for α-particle scattering experiment (Rutherford) is best represented by

(1) 

(2) 

(3) 

(4) 

41. The half life of a radioactive substance is 20 days. The time spent between 40% decay to 85% decay of initial number of nuclei is

(1) 20 days (2) 40 days

(3) 10 days (4) 30 days

42. The wavelength of radiation emitted, when an electron jumps from the third to second orbit of hydrogen atom is λ. The wavelength of radiation emitted for the electron jumps from the fourth to second orbit of hydrogen atom will be

(1) $\frac{27\lambda}{20}$ (2) $\frac{20\lambda}{27}$

(3) $\frac{4\lambda}{5}$ (4) $\frac{5\lambda}{4}$

43. An electron hole pair is formed when light of maximum wavelength 6000 Å is incident on the semiconductor. The band gap energy of the semiconductor is approximately

(1) 4 eV (2) 0.4 eV

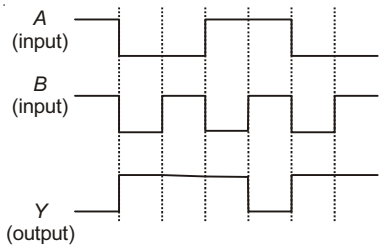
(3) 0.2 eV (4) 2 eV

44. For a CE transistor amplifier, the audio signal voltage across the collector resistance of 2 kΩ is 2 volt. If the current amplification factor of the transistor is 100 and the base resistance is 1 kΩ then the input signal voltage is

(1) 1 mV (2) 10 mV

(3) 100 mV (4) 1 volt

45. The waveform for input A, B and output Y for a logic gate has been shown below.



The concerned logic gate is

(1) NOR gate (2) NAND gate

(3) AND gate (4) OR gate

CHEMISTRY

46. Base having highest pK_a value among the following is

(1) KOH (2) NaOH

(3) $Be(OH)_2$ (4) LiOH

47. Optical isomerism is not shown by

(1) $[Co(en)_2Cl_2]^+$ (2) $[Co(NH_3)_3Cl_3]$

(3) $[Co(en)_3]^{3+}$ (4) $[CoCl_2(en)(NH_3)_2]^+$

48. Which of the following relation is correct?

(1) Volume strength of H_2O_2 = 5.6 × Normality

(2) Volume strength of H_2O_2 = 11.2 × Molarity

(3) '100 volume' H_2O_2 = 30% H_2O_2

(4) All of these

49. $Cr_2O_7^{2-} \longrightarrow Cr^{3+}$, equivalent mass of $Cr_2O_7^{2-}$ ion (Molar mass = M) in this process is

(1) $\frac{M}{2}$ (2) $\frac{M}{6}$

(3) $\frac{M}{5}$ (4) $\frac{M}{3}$

50. Which of the following would be a square planar paramagnetic complex?

(1) $[Ni(CN)_4]^{2-}$ (2) $[Ni(CO)_4]$

(3) $[Cu(NH_3)_4]^{2+}$ (4) $[CuCl_4]^{3-}$

51. Maximum number of electrons having m = 0 in Ar (per atom) is
(1) 8 (2) 10
(3) 0 (4) 2

52. Which of the following match is incorrect?

	Molecule/Ion	Shape	Bond angle
(1)	NH_4^+	Tetrahedral	109°28′
(2)	ClO_4^-	Tetrahedral	109°28′
(3)	ClO_3^-	Pyramidal	109°28′
(4)	NO_3^-	Trigonal planar	120°

53. Coloured compound(s) among the following is/are
(1) KO_2 (2) $KMnO_4$
(3) $CrCl_3$ (4) All of these

54. Correct orders among the following are
I. $H^+ < H < H^-$ (Atomic/ionic radii)
II. O < N < F (First ionization energy)
III. $Br_2 < Cl_2 < F_2$ (Oxidizing power)
IV. $Br_2 < Cl_2 < F_2$ (Bond energy)
(1) I, II only (2) II, III only
(3) I, II, III only (4) I, II, III, IV

55. Maximum paramagnetism is shown by
(1) M^{2+} (Z = 26) (2) M^{3+} (Z = 25)
(3) M^+ (Z = 24) (4) M^{2+} (Z = 29)

56. Bleaching powder can oxidise NH_3 into
(1) N_2 (2) NO_3^-
(3) NO_2^- (4) NO

57. Catalyst used in preparation of HNO_3 by Ostwald process is
(1) Pt (2) Fe
(3) Fe_2O_3 (4) V_2O_5

58. A dilute solution of H_2O_2 can be concentrated by
(1) Drying it over anhyd. $CuCl_2$
(2) Drying it over conc. H_2SO_4
(3) Drying it over anhyd. $MgSO_4$
(4) Distillation under reduced pressure

59. The maximum number of moles of acetic anhydride consumed on reaction with 1 mole of glucose is
(1) 2 (2) 4
(3) 5 (4) 6

60. How much charge per second is required to produce hydrogen gas at the rate of 1 mL s^{-1} at STP by the electrolysis of aqueous NaCl?
(1) 8.6 C (2) 5.9 C
(3) 4.5 C (4) 10.5 C

61. The number of body diagonal planes and rectangular planes respectively in a cubic unit cell are
(1) 6, 3 (2) 3, 6
(3) 4, 3 (4) 3, 4

62. Which of the following aq. solution has maximum boiling point? (Assume complete dissociation of electrolytes)
(1) 0.1 m KNO_3 (2) 0.01 m KCl
(3) 0.5 m urea (4) 0.2 m $K_4[Fe(CN)_6]$

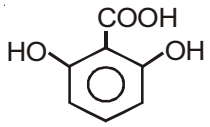
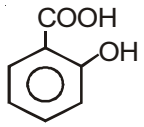
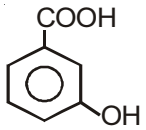
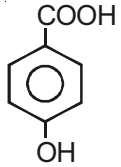
63. The rate expression for the reaction A(g) + B(g) → C(g) is rate = K $[A]^2$ $[B]^{1/2}$. What change in the initial concentrations of A and B will cause the rate of reaction to increase by a factor of eight ?
(1) 2 × [A], 4 × [B] (2) 4 × [A], 2 × [B]
(3) 3 × [A], 4 × [B] (4) 3 × [A], 6 × [B]

64. 1 g hydrated oxalic acid upon combustion produces 2.2 kcal of heat. Its enthalpy of combustion is
(1) –2.2 kcal (2) –126 kcal
(3) –277.2 kcal (4) –423 kcal

65. The enthalpy of solution of $BaCl_2$ and $BaCl_2.2H_2O$ are –x and y kJ/mol respectively. The enthalpy of hydration of $BaCl_2$ is
(1) (x – y) kJ (2) (x + y) kJ
(3) (x – 2y) kJ (4) –(x + y) kJ

66. One litre of N_2 and $\frac{7}{8}$ litre of O_2 at the same temperature and pressure were mixed. The relation between the masses of the two gases in the mixture is
(1) $M_{N_2} = M_{O_2}$ (2) $M_{N_2} = 2M_{O_2}$
(3) $M_{N_2} = 6M_{O_2}$ (4) $2M_{N_2} = 3M_{O_2}$

67. The number of atoms in 5.6 litre CO_2 at STP is approximately
(1) 4.52×10^{23} (2) 6.01×10^{23}
(3) 2.30×10^{24} (4) 6.5×10^{24}

68. The most acidic among the following is
(1) 
(2) 
(3) 
(4) 

69. PbI_2 has maximum solubility in
(1) 0.1 M $PbCl_2$ (2) 0.1 M KI
(3) 0.01 M CaI_2 (4) 0.01 M NaI

70. Which one of the following forms micelle in aqueous solution above CMC and Kraft temperature?
(1) Glucose (2) Sodium stearate
(3) Urea (4) Pyridinium chloride

71. Correct IUPAC name of $CH_3CH_2–O–CH_2CH_2CH_3$ is
(1) Diethyl ether (2) Ethyl propyl ether
(3) 1-Ethoxypropane (4) Ethyl propyl ketone

72. The cyclic compound having minimum angle strain is
(1) C_3H_6 (2) C_4H_8
(3) C_5H_{10} (4) C_6H_{12}

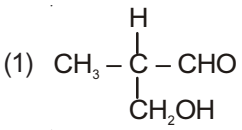
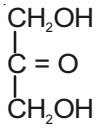
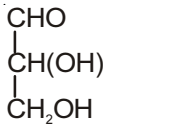
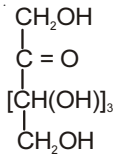
73. Number of chloro compounds obtained when ethane is treated with excess of Cl_2 in the presence of UV light is
(1) 10 (2) 4
(3) 6 (4) 9

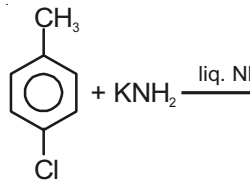
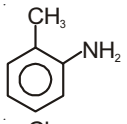
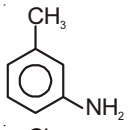
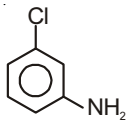
74. Which of the following esters cannot give Claisen condensation in the presence of C_2H_5ONa?
(1) $CH_3COOC_2H_5$
(2) $CH_3CH_2COOC_2H_5$
(3) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOC_2H_5$
(4) All of these

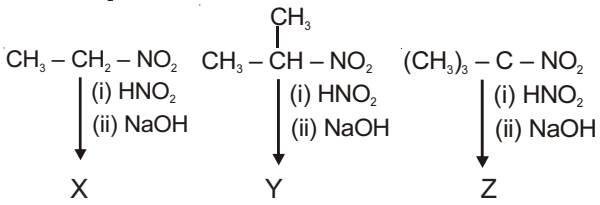
75. In which of the following reactions, product obtained will have less number of carbon atom(s) than parent reactant?
(1) Wurtz reaction
(2) Borodine Hunsdiecker reaction
(3) Aldol condensation
(4) Fittig reaction

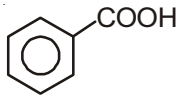
76. Which of the following does not decolourise Baeyer's reagent?
(1) $CH_3 – C \equiv C – CH_3$
(2) $CH_2 = CH – CH = CH – CH = CH_2$
(3) 
(4) $H_2C = C = CH_2$

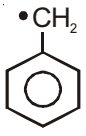
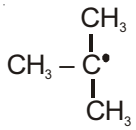
77. $CH_3 – CH_2CH_2OH$ cannot be prepared by
(1) $CH_3CH_2COOCH_3 \xrightarrow[\text{Ether}]{LiAlH_4}$
(2) $CH_3 – CH_2CHO \xrightarrow[\text{Ether}]{LiAlH_4}$
(3) $CH_3MgBr + \underset{\displaystyle CH_2-CH_2}{\overset{\displaystyle O}{\diagup\!\diagdown}} \xrightarrow{H_2O/H^+}$
(4) $CH_3CH_2MgBr \xrightarrow[(II)\ H_3O^+]{(I)\ CO_2}$

78. Which of the following compounds cannot be considered as a carbohydrate?
(1) 
(2) 
(3) 
(4) 

79. 
Product of above reaction is
(1) 
(2) 
(3) 
(4) 

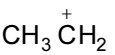
80. 
The colour of X, Y & Z respectively are
(1) Yellow, Colourless, Red
(2) Red, Blue, Colourless
(3) Blue, Red, Colourless
(4) Blue, Red, Yellow

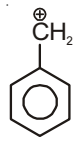
81. HCOOH and  can be distinguished by
(1) $NaHCO_3$ test (2) Tollen's test
(3) Lucas test (4) Iodoform test

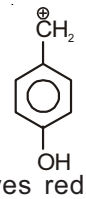
82. $CH_2 = CH – \dot{C}H_2$ 
(I) (II)
 $CH_3\dot{C}H_2$
(III) (IV)
The correct order of stability of above free radicals is
(1) I > II > III > IV (2) II > III > I > IV
(3) II > I > III > IV (4) III > II > I > IV

83. Most stable carbocation among the following is

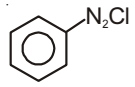
(1) 

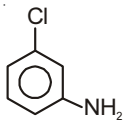
(2) 

(3) 

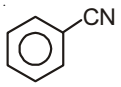
(4) 

84. Which of the following gives red colouration in Lassaigne's test?

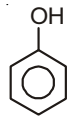
(1) 

(2) 

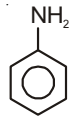
(3) CH_3CH_2SCN

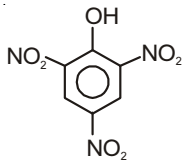
(4) 

85. The compound having highest value of K_a among the following is

(1) 

(2) CH_3COOH

(3) 

(4) 

86. If 11.2 L of H_2S and 11.2 L of SO_2 at STP is allowed to react, then the mass of colloidal sulphur obtained is

(1) 24 g (2) 48 g

(3) 12 g (4) 96 g

87. Which of the following set of quantum numbers is not possible ?

(1) n = 5, l = 0, m = 0, s = $+\frac{1}{2}$

(2) n = 1, l = 1, m = 0, s = $-\frac{1}{2}$

(3) n = 3, l = 2, m = –1, s = $-\frac{1}{2}$

(4) n = 2, l = 1, m = 0, s = $+\frac{1}{2}$

88. The logarithm of the equilibrium constant, log K_{eq}, if the net cell reaction of the cell $x(s) \mid x^{2+} \parallel y^{+} \mid y(s)$ is [E°_{Cell} = 1.20 V]

(1) 55.46 (2) 40.6

(3) 15.74 (4) 9.86

89. The unit of rate constant for 2nd order reaction is

(1) s^{-1} (2) L $mole^{-1}$ s^{-1}

(3) $mole^{-2}$ L^2 s^{-1} (4) L $mole^{-2}$ s^{-2}

90. In which of the following reaction(s) hybrid state of underlined atom is changed during the product formation?

(1) $\underline{S}O_2 + H_2O \longrightarrow$ (2) $\underline{N}H_3 + H_2O \longrightarrow$

(3) $\underline{Xe}F_6 + 3H_2O \longrightarrow$ (4) Both (1) & (3)

BIOLOGY

91. Consider the following statements and select the **correct** ones.

a. The most obvious and technically complicated features are metabolism and consciousness.

b. Growth and reproduction are mutually inclusive events for euglenoids and chrysophytes.

c. Generally, families and orders are identified on the basis of aggregates of vegetative characters only.

d. Herbarium serves as quick referral system in taxonomical studies.

(1) b, c & d (2) a, c & d

(3) b & d (4) a, b, c & d

92. How many kingdoms are represented by organisms mentioned in the box given below w.r.t five kingdom system of classification?

Anabaena, Chlorella, Trypanosoma, Rhizopus, Physarum, Gonyaulax, Plasmodium, Paramoecium

(1) Three (2) Two

(3) Four (4) Five

93. Monerans with smallest living cells

(1) Have peptidoglycan nature of cell wall

(2) Are facultative aerobes

(3) Have both types of nucleic acids

(4) Reproduce mainly by multiple fission

94. Aggregated stage of slime moulds is called (A) which differentiates during unfavourable conditions to form (B)

	A	B
(1)	Fruiting bodies	Pseudoplasmodium
(2)	Plasmodium	Sporocarp
(3)	Sporocarp	Myxamoebae
(4)	Plasmodium	Cleistothecium

95. Longer dikaryophase and absence of sex organs are characteristics of a class that includes

(1) Bracket fungi, smut fungi and puffballs

(2) Rust fungi, mushroom and morels

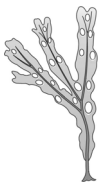
(3) Dung fungi, algal fungi and mushroom

(4) Bread mould, coprophilous fungi and puffballs

96. Classification of organisms on the basis of base sequencing of nucleic acids is adopted as a criterion by
(1) Cytotaxonomist
(2) Karyotaxonomist
(3) Classical taxonomist
(4) Chemotaxonomist

97. Select the **correct** option w.r.t. given diagrams.


A


B

(1) A – Reserve food structurally similar to amylopectin
B – Oogamous reproduction
(2) A – Oogamous reproduction by involvement of motile ♂ gamete
B – Zoospores with lateral flagella
(3) A – *Ulva* of chlorophyceae
B – Grass green in colour
(4) A – Chlorophyll a and d
B – Chlorophyll a and floridean starch

98. Mosses have
(1) Dependent gametophyte possessing spore forming stage
(2) Elaborate mechanism of spores dispersal
(3) Unicellular rhizoids
(4) Mitospores producing structure known as capsule

99. Consider the given statements :
a. *Salvinia* is a heterosporous terrestrial fern.
b. The male and female gametophytes do not have an independent free living existence in gymnosperms.
c. The life cycle of angiosperm is diplontic.
(1) All are correct
(2) Only b is correct
(3) Only a is incorrect
(4) a and c are correct

100. Select the **correct** match.
(1) Phanerogams without ovary – Gymnosperms
(2) Archegoniates without NCC – Angiosperms
(3) Vascular amphibians – Bryophytes
(4) Non-vascular embryophytes – Pteridophytes

101. Plants of coastal biome have special structure for breathing, that is modified ____ in ____.
(1) Tap root, *Pandanus*
(2) Adventitious root, *Avicennia*
(3) Tap root, *Rhizophora*
(4) Fibrous root, *Sonneratia*

102. Which one of the following is **incorrectly** matched pair?
(1) Hypogynous flower – Mustard
(2) Axile placentation – *Argemone*
(3) Asymmetric flower – *Canna*
(4) Imbricate aestivation – Gulmohur

103. Features like perennial herbs with underground modified stems, ex-stipulate leaves with parallel venation and actinomorphic, trimerous flowers; are associated with angiospermic family ____.
(1) Fabaceae (2) Brassicaceae
(3) Liliaceae (4) Solanaceae

104. Select the **correct** statement for coconut fruit
(1) Entire pericarp is hard and stony
(2) Develops from tricarpellary ovary of epigynous flower
(3) Middle layer of pericarp is specialised for food storage
(4) Endosperm is edible part

105. The continued formation and accumulation of secondary xylem leads to
(1) Obliteration of primary xylem
(2) Gradual crushing of primary phloem only
(3) Crushing of primary and secondary phloem gradually
(4) Loss of heartwood and pith

106. In mature parts of most of the flowering plants, the tissues formed after dedifferentiation are
(1) Fibres, xylem, phloem
(2) Sapwood, late wood, secondary phloem
(3) Phellem, phelloderm, bark
(4) Interfascicular cambium, phellogen

107. Elongated or columnar mesophyll cells without intercellular spaces are found towards
(1) Adaxial epidermis of dorsiventral leaf
(2) Abaxial epidermis of dorsiventral leaf
(3) Adaxial epidermis of isobilateral leaf
(4) Abaxial side of isobilateral leaf

108. Select the **correct** set of statements from given below.

a. The cytoplasm is the main arena of cellular activities in plants and animals.

b. Cell envelope in bacteria is tightly linked 2-layered structure.

c. The endomembrane system does not include semi-autonomous organelles.

d. Convex face of golgi bodies is maturing face.

(1) a & d (2) a & c

(3) a, c, d (4) All are correct

109. The interval between mitosis and synthesis phase is characterised by

(1) Replication of DNA

(2) Synthesis of tubulin proteins

(3) Synthesis of deoxyribonucleotides

(4) Centrioles duplication

110. What will be chromosomes number and DNA amount in sporocyte of liverworts in G_2-phase if spore contains 20 chromosomes with 10 Picogram DNA?

(1) 20, 40 Pg (2) 40, 20 Pg

(3) 40, 40 Pg (4) 20, 20 Pg

111. Meiosis **does not** involve two sequential cycle of

(1) Karyokinesis (2) Cytokinesis

(3) Centrioles duplication (4) DNA replication

112. Bulk flow of substances through xylem occurs when

a. A positive pressure is developed during passive absorption.

b. A negative pressure developed under high transpiration.

c. Water is forced to move beyond cortex through apoplastic pathway.

(1) Only b is correct

(2) Only a is correct

(3) Both b & c are correct

(4) All are correct

113. Most of the nitrogen and phosphorus travels through xylem as ____ respectively.

(1) Inorganic and organic compounds

(2) Organic and inorganic compounds

(3) Inorganic and inorganic compounds

(4) Organic and organic compounds

114. Leg-haemoglobin is a pigment which

(1) Is formed by bacteria and non-leguminous plants

(2) Protects the nitrate reductase from molecular oxygen

(3) Acts as O_2 scavanger during nitrogen fixation

(4) Both (1) & (3)

115. Non-cyclic journey of electrons in light reaction is similar to cyclic transfer of electrons in

(1) Involvement of two types of photosystems

(2) Photolysis of water

(3) Pumping of H^+ from stroma to lumen

(4) Involvement of NADP reductase activity

116. The redox equivalents as two hydrogen atoms are released from 5–C substrate in aerobic respiration by the activity of enzyme

(1) Pyruvate dehydrogenase

(2) Phosphoglyceraldehyde dehydrogenase

(3) α-Ketoglutarate dehydrogenase

(4) Malate dehydrogenase

117. The growth pattern during development of embryo from zygote in plants is

(1) Geometric growth only

(2) Arithmetic growth only

(3) First geometric then arithmetic

(4) First arithmetic then geometric

118. Select the **correct** match w.r.t. plant growth regulators.

	Column I		**Column II**
a.	Mobilisation of nutrients	(i)	Auxin
b.	Eradication of weeds	(ii)	Cytokinin
c.	Stops cambium activity	(iii)	GA_3
d.	Bolting effect	(iv)	ABA

(1) a(ii), b(i), c(iv), d(iii)

(2) a(ii), b(i), c(iii), d(iv)

(3) a(i), b(ii), c(iv), d(iii)

(4) a(iv), b(i), c(iii), d(ii)

119. Identify **odd one** w.r.t. the stage which occurs after most vital event of sexual life cycle.

(1) Ovule to seed development

(2) PEN to endosperm development

(3) Megaspore to embryo sac development

(4) Zygote to embryo development

120. Find out the **correct** developmental sequence in embryogeny for the following structures:

a. Heart shaped stage b. Two-celled stage

c. Globular stage d. Mature embryo

(1) b, a, c, d (2) c, b, a, d

(3) b, c, d, a (4) b, c, a, d

121. Choose the **incorrectly** matched pair:

(1) Syncarpous pistil – *Hibiscus*

(2) Apocarpous pistil – *Michelia*

(3) Monosporic embryo sac – *Polygonum*

(4) Cleistogamous flower – *Mirabilis*

122. In which one of the following plants, endosperm is not consumed completely by developing embryo and it may persist in mature seed?

(1) Pea (2) Groundnut

(3) Bean (4) Castor

123. How many phenotypes and genotypes are possible in progeny from mulatto mother and very light skin coloured father if human skin colour is controlled by three pairs of polygenes?

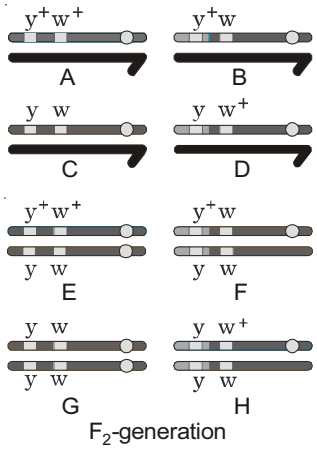
(1) 4 Phenotypes and 8 Genotypes

(2) 7 Phenotypes and 27 Genotypes

(3) 8 Phenotypes and 27 Genotypes

(4) 4 Phenotypes and 9 Genotypes

124. Select recombinant progenies from F_2-generation of dihybrid cross performed by Morgan in fruitfly.



(1) B, D, F, H (2) A, C, E, G

(3) B, C, F, G (4) A, D, F, G

125. Which one of the following is **incorrectly** matched?

(1) Turner's syndrome – AA + XO

(2) Intersex *Drosophila* – AAA + XXY

(3) Sickle cell anaemia – Transition mutation

(4) Thalassemia – Frameshift mutation

126. Which one of the following is **incorrectly** matched?

(1) Dominancy of RNA world – Splicing

(2) DNA template with polarity $5' \rightarrow 3'$ – Continuous replication of DNA

(3) Non-degenerate codon – UGG

(4) Chromosome number 1 of human – 2968 genes

127. Consider the following statements and select the **correct** ones.

a. Total number of N-glycosidic linkages in bacteriophage ϕ ×174 is 5386.

b. Two nucleotides are linked through 5′–3′ phosphodiester bond.

c. The pitch of the DNA helix is 3.4 Å

d. Stability of the DNA helical structure is conferred by H-bonds and the plane of one base pair stacks over the other.

e. The average rate of polymerisation of DNA polymerase III is 2000 bp per second.

(1) a, b & c (2) a, d & e only

(3) a, b, d & e (4) a, c, d & e

128. The exons are not interrupted by intervening sequences in

(1) hnRNA and mRNA

(2) Archaebacteria and primary transcript

(3) Eubacterial DNA and mRNA

(4) mRNA, split genes and tRNA

129. High yielding and disease resistant varieties of wheat introduced in wheat growing belt of India in 1963 were

(1) Norin-10 and Sonora 64

(2) Sonalika and Kalyan sona

(3) HUW468 and P1542

(4) Jaya and ADT-37

130. Which of the following set of products are produced by bacteria?

a. Curd

b. Penicillin

c. Acetic acid

d. Streptokinase

(1) b, c and d (2) a, c and d

(3) a, b and c (4) a, b and d

131. Select the **incorrect** statement.
(1) Flocs are formed in secondary treatment of sewage
(2) A bioactive molecule, cyclosporin A, is produced by an organism of class Deuteromycetes
(3) Baculoviruses have species–specific, broad spectrum insecticidal applications
(4) Many members of genus *Glomus* form mycorrhiza

132. If in a pond, there are 40 lotus plants last year and through reproduction 10 new plants are added, taking the current population to 50. The birth rate is as
(1) 0.25 offspring per lotus per year
(2) 0.25 offspring per lotus per day
(3) 0.25 offspring per total population per year
(4) 0.5 offspring per total population per year

133. Rate of increase in biomass by consumers per unit time and area is called
(1) GPP
(2) NPP
(3) Secondary productivity
(4) Net production efficiency

134. Select the **correct** statement w.r.t. biodiversity.
(1) A stable community must be either resistant or resilient to occasional disturbances
(2) Species diversity increases from lower to higher latitudes
(3) Extinction of Steller's sea cow and passenger pigeon occurred due to habitat loss and fragmentation
(4) All the biodiversity hotspots put together cover more than 2 percent of the earth's land area

135. Which one of the following can remove over 99 percent particulate matter present in the exhaust from a thermal power plant?
(1) Scrubber
(2) Catalytic converters
(3) Electrostatic precipitator
(4) Green muffler

136. Lipids play a role in all of the following **except**
(1) Long term energy storage
(2) Structures in cells
(3) Enzymes
(4) Sex hormones

137. Parasitic worm which is dioecious and have internal fertilization is
(1) *Hirudinaria* (2) *Ascaris*
(3) *Taenia* (4) *Nereis*

138. The pO_2 in systemic arteries and systemic veins are respectively
(1) 95 and 40 mmHg (2) 95 and 45 mmHg
(3) 40 and 95 mmHg (4) 104 and 40 mmHg

139. A person who is A^- can receive blood from which of the following donors?
a. A^+ b. A^-
c. AB^+ d. O^+
e. O^-
(1) a, b, d & e (2) b & e
(3) d & e (4) b, d & e

140. The juxta-glomerular cells (JG cells) are stimulated to produce renin in case of
(1) Fall in GFR
(2) Rise in blood pressure
(3) Rise in glomerular blood flow
(4) Hypoxia

141. Choose the **incorrect** statement w.r.t. life cycle of cockroach
(1) It undergoes paurometabolous development
(2) Eggs are centrolecithal and macrolecithal
(3) The nymphs moult 13 times to reach adult stage
(4) Moulting is stimulated by ecdysone hormone secreted by corpora allata

142. Which of the following does **not** negatively affect the activity of allosteric enzyme?
(1) Temperature
(2) Presence of coenzymes
(3) pH
(4) Product concentration

143. The first clinical gene therapy was given in 1990 to a four year old girl suffering from SCID. The process involved
(1) Transferring ADA gene into the blood
(2) Treatment by enzyme replacement therapy
(3) Introduction of functional ADA c-DNA (using a retroviral vector) into the lymphocytes of patient, which are subsequently returned to the patient
(4) Transferring ADA gene via DNA vaccine method

144. A very effective sedative and painkiller which is useful for patients who have undergone surgery is
(1) Opium in raw form (2) Morphine
(3) Diacetylmorphine (4) Barbiturates

145. Neoplastic transformation by DNA damage can be brought about by several factors. Choose the factors which lead to oncogenic transformation within cells.
a. UV rays b. X-rays
c. Radiowaves d. Tobacco smoke
e. Retrovirus
(1) a, b & c (2) a, b, d & e
(3) a, b & d only (4) b & d only

146. Match the following parts of sperm and their respective functions.

Column I		Column II
a. Head	(i)	Hyaluronidase
b. Middle piece	(ii)	Energy
c. Acrosome	(iii)	First cleavage division
d. Proximal centriole	(iv)	Genetic material
	(v)	Maintains axial filament

(1) a(iii), b(iv), c(v), d(i)
(2) a(iv), b(ii), c(i), d(iii)
(3) a(iv), b(ii), c(i), d(v)
(4) a(ii), b(iv), c(iii), d(v)

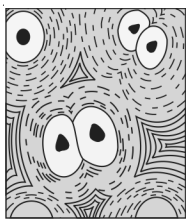
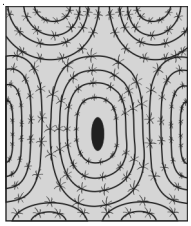
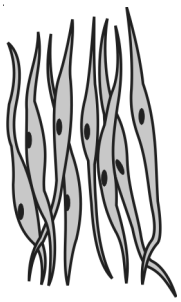
147. The step catalysed by Taq polymerase in PCR is
(1) Denaturation of template DNA
(2) Annealing of primers to template DNA
(3) Extension of primers corresponding to the template DNA
(4) All of these

148. Given below are certain animals in box

Pheretima, Periplaneta, Nereis, Ascidia, Octopus
Pila, Hirudinaria, Chelone, Salpa, Pristis
Hilsa, Branchiostoma, Myxine

How many of them are chordates having closed circulatory system?
(1) Five (2) Seven
(3) Eight (4) Nine

149. Complete the following analogy
Prawn : Green gland :: King crab : _____
(1) Antennary gland (2) Malpighian tubules
(3) Gills (4) Coxal gland

150. Presence of lamellae is the characteristic feature of
(1) 
(2) 
(3) 
(4) 

151. Choose the **incorrect** match w.r.t. the structures and their locations in the body of male or female cockroach.
(1) Mushroom gland – 6^{th} – 7^{th} abdominal segments
(2) Testes – 4^{th} – 6^{th} abdominal segments
(3) Ovary – 2^{nd} – 6^{th} abdominal segments
(4) Spermatheca – 7^{th}– 8^{th} abdominal segments

152. The immunity responsible for graft rejection is
(1) Humoral immunity
(2) Antibody mediated immunity
(3) Cell mediated immunity
(4) Both (2) & (3)

153. *Homo erectus* had a cranial capacity of
(1) 650–800 cc (2) 900 cc
(3) 1400 cc (4) 1650 cc

154. All the given statements are correct except one. Choose the **incorrect** statement
(1) Significant digestive activity occurs in large intestine
(2) The egestion of faeces to the outside through the anal opening is a voluntary process and is carried out by a mass peristaltic movement
(3) Glucose and some amino acids are absorbed from the intestinal lumen with the help of carrier proteins
(4) The activities of gastrointestinal tract are under neural and hormonal control

155. Which of the following events occur when the ventricular pressure declines?
(1) Closure of aortic and pulmonary valves
(2) Closure of bicuspid and tricuspid valves
(3) Opening of bicuspid and tricuspid valves
(4) Both (1) & (3)

156. Which event will be suitable for a person having large amount of myoglobin in his muscles?
(1) High jump (2) 100 m sprinter
(3) Marathon runner (4) All of these

157. In a resting muscle, the central part of the thick filament is not overlapped by thin filaments. This region is called
(1) Z-line (2) A-band
(3) I-band (4) H-zone

158. The common symptom(s) of both diabetes mellitus and diabetes insipidus is/are
(1) Hyperglycemia (2) Glycosuria
(3) Diuresis and polydipsia (4) Ketonuria

159. Presence of which hormone in the female urine confirms pregnancy?
(1) Estrogen
(2) Human chorionic gonadotropin
(3) FSH
(4) Prolactin

160. In adenohypophysis different types of principal cells are found which secrete different types of hormones
Mark the **incorrect** cell w.r.t. its secretion
(1) Gonadotroph – Follicle stimulating hormone
(2) Corticotroph – Growth hormone
(3) Thyrotroph – Thyroid stimulating hormone
(4) Lactotroph – Prolactin

161. The excretory products of the largest gland of human body are
(1) Carbon dioxide and water vapour
(2) Urea and creatinine
(3) Bilirubin and biliverdin
(4) NaCl and lactic acid

162. Second polar body is released after 'A' in 'B' region of female reproductive system
(1) A – First meiotic division, B – Ovary
(2) A – Second meiotic division, B – Cervix
(3) A – Second meiotic division, B – Ovary
(4) A – Second meiotic division, B – Oviduct

163. Lactational amenorrhoea is due to high level of
(1) Follicle stimulating hormone
(2) Luteinizing hormone
(3) Prolactin
(4) Both (1) and (2)

164. Active artificial immunization is induced by the administration of all the following, **except**
(1) Bacterial products (2) Antitoxins
(3) Toxoid (4) Vaccine

165. An example of three horned dinosaur that was common during upper cretaceous period is
(1) *Brachiosaurus* (2) *Stegosaurus*
(3) *Triceratops* (4) *Tyrannosaurus*

166. In case of a female who suffers from anovulation but has normal physiological conditions available for carrying out fertilization and embryonic development; the preferred ART should be
(1) ZIFT (2) GIFT
(3) ET (4) ICSI

167. Select the **incorrect** statement w.r.t. AIDS.
(1) The gp 120 in the outermost envelope of the virus binds with CD-4 receptors of target cells.
(2) HIV multiplies within the macrophages of host which are also called HIV factories
(3) The destruction of cytotoxic T cells by HIV causes appearance of syndrome
(4) Being HIV positive and having AIDS are two separate conditions as appearance of syndrome does not occur for a long time after virus entry

168. In a population of 100 individuals, 9 have attached ear lobes which is a recessive character. What is the number of heterozygotes for this characteristic in the population?
(1) 42 (2) 36
(3) 49 (4) 7

169. When parietal cells of gastric gland are stimulated, they secrete
(1) HCl and intrinsic factor
(2) HCl and pepsinogen
(3) HCO_3^- and intrinsic factor
(4) HCl and HCO_3^-

170. The failure of opening of voltage-gated Ca^{2+} channels present in the membrane of synaptic knob will result in
(1) Lack of generation of impulses
(2) Lack of conduction of impulse on axolemma
(3) Lack of repolarization of axolemma
(4) Lack of release of neurotransmitter from axon terminals

171. A tissue is a group of cells performing common functions and having common origin. Which of the following cells in the human tissues do not have mesodermal origin?
(1) Fibroblasts (2) Mast cells
(3) Macroglia (4) Microglial cells

172. Consider the following statements w.r.t. gel electrophoresis
(a) The gel used for isolation of DNA fragments is made of agarose which is a mucopoly-saccharide.
(b) DNA fragments are separated according to their charge only, their sizes do not affect the process.
(c) Separation of DNA fragments is according to their sizes as they move through sieves in the agarose gel.
(d) DNA fragments move towards cathode on the basis of their charges.
Which of the following sets contains only **incorrect** statements?
(1) (a), (b) & (d) (2) (b) & (d) only
(3) (b) only (4) (a), (b), (c) & (d)

173. Synarthrosis is
(1) Completely immovable and exist between skull bones
(2) Slightly compressible and occur between adjacent vertebrae
(3) Feely movable and are present between mandible and mandibular arches
(4) Slightly compressible and are found in pubic symphysis

174. If a gene encoding for 'ADA' enzyme is incorporated in lac z sequence of pUC 18 plasmid, the resultant recombinant bacteria will have/give
(1) Functional lac z gene coding for galactosidase
(2) White coloured colonies on 'X-gal' containing selection medium
(3) Blue coloured colonies on 'X-gal' containing selection medium
(4) Both (1) & (3)

175. Select the **incorrect** match w.r.t. different parts of the brain and their respective functions.
(1) Amygdala – Defense castle of body
(2) Medulla oblongata – Emesis reflex
(3) Cerebellum – Intelligence, logical reasoning and Wernicke's association area
(4) Cerebrum – Broca's area

176. Partial pressure of O_2 of 104 mm of Hg in the alveoli oxygenates the capillary blood. When 1000 ml of this oxygenated blood is pumped to the striated muscle tissue undergoing strenuous exercise, the total amount of oxygen it will release into muscles is _____ with the oxy-Hb curve shifting to _____ side. Select the option which fills blanks correctly.
(1) 15 ml, Left (2) 5 ml, Left
(3) 150 ml, Right (4) 50 ml, Right

177. Consider the following statements w.r.t. origin of life on earth
(a) Earliest autotrophs were oxygenic photoautotrophs.
(b) Chemical origin of life occurred in absence of molecular oxygen in warm little ponds.
Select the correct option
(1) Only (a) is correct
(2) Only (b) is correct
(3) Both (a) & (b) are correct
(4) Both (a) & (b) are incorrect

178. Inbreeding depression which is a result of continuous mating between related individuals, results in reduced fertility and productivity. It can be overcome by
(1) Outcrossing
(2) Crossbreeding
(3) Interspecific mating
(4) Outbreeding

179. Select the **incorrect** statement w.r.t. ringworm infection in humans.
(1) Ringworm infections thrive in body parts having high moisture and high temperature conditions
(2) Ringworms in groin area is called *Tinea cruris*
(3) Ringworm disease is caused by nematode parasites or round worms which have circular bodies in cross section
(4) Ringworms spread through direct contact or by sharing clothes and towels with infected individuals

180. The "cry' gene inserted in 'Bt cotton' which makes it tolerant to attacks of 'corn borer' pest is
(1) Cry I Ab
(2) Cry II Ab
(3) Cry I Ac
(4) Cry II Ac

❑ ❑ ❑