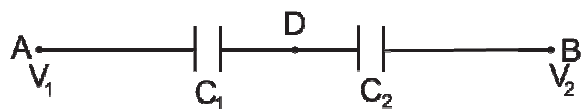


AIPMT ONE FREE MODEL PAPER

PHYSICS

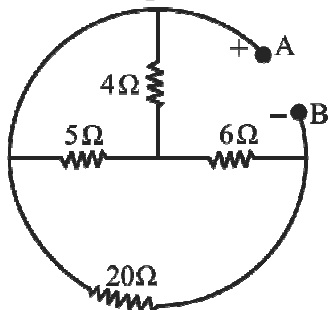
- Order of e/m ratio of proton, α -particle and electron is
 - $\left(\frac{e}{m}\right)_p > \left(\frac{e}{m}\right)_\alpha > \left(\frac{e}{m}\right)_e$
 - $\left(\frac{e}{m}\right)_e > \left(\frac{e}{m}\right)_p > \left(\frac{e}{m}\right)_\alpha$
 - $\left(\frac{e}{m}\right)_\alpha < \left(\frac{e}{m}\right)_e > \left(\frac{e}{m}\right)_p$
 - none of these
- A parallel plate capacitor is made by stocking and equally spaced plates connected alternately. If the capacitance between any two plates is C , then the resulting capacitance is
 - C
 - nC
 - $(n - 1)C$
 - $(n + 1)C$
- Two condensers C_1 and C_2 in a circuit are joined as shown in figure. The potential of point A is V_1 and that of point B is V_2 . The potential of point D will be



- $\frac{1}{2}(V_1 + V_2)$
- $\frac{C_1 V_2 + C_2 V_1}{C_1 + C_2}$
- $\frac{C_1 V_1 + C_2 V_2}{C_1 + C_2}$

(d)
$$\frac{C_2 V_1 - C_1 V_2}{C_1 + C_2}$$

4. Find the equivalent resistance between A and B.



- (a) 3.05 Ω
- (b) 2.87 Ω
- (c) 5.83 Ω
- (d) 6.47 Ω

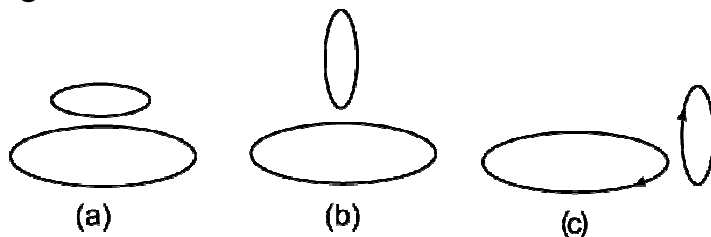
5. A point charge $50 \mu\text{C}$ is located in the XY plane at the point with position

vector $\vec{r}_0 = 2\hat{i} + 3\hat{j}$. What is the electric field at the point of position vector

$\vec{r}_1 = 8\hat{i} - 5\hat{j}$?

- (a) 1200 V/m
- (b) 0.04 V/m
- (c) 900 V/m
- (d) 4500 V/m

6. Two circular coils can be arranged in any of the three situations shown in the figure. Their mutual inductance will be



- (a) maximum in situation (a)
- (b) maximum in situation (b)
- (c) maximum in situation (c)

- (d) the same in all situations
7. Moon has no atmosphere as
- (a) Gravity of moon is 6 times that of earth
 - (b) Radius of moon is smaller than that of earth
 - (c) Escape velocity of moon is smaller than the root mean square speed of molecules of the gas
 - (d) Escape velocity of moon is greater than the root mean square speed of molecules of the gas
8. Two similar charges having mass m and $2m$ are placed in an electric field. The ratio of their kinetic energy is :
- (a) 4 : 1
 - (b) 1 : 1
 - (c) 2 : 1
 - (d) 1 : 2
9. Whenever a magnet is moved either towards or away from a conducting coil, an emf is induced, the magnitude of which is independent of
- (a) the strength of the magnetic field
 - (b) the speed with which the magnet is moved
 - (c) the number of turns in the coil
 - (d) the resistance of the coil
10. The first member of Balmer series of hydrogen spectrum has a wavelength of 6563 \AA . What is the wavelength of second member?
- (a) 8461 \AA
 - (b) 4681 \AA
 - (c) 4861 \AA
 - (d) 8641 \AA
11. A car travels 6 km towards north at an angle of 45° to the east and then travels distance of 4 km towards north at an angle 135° to east. How far is the point from the starting point? What angle does the straight line joining its initial and final position makes with the east?

- (a) $\sqrt{50}$ km and $\tan^{-1}(5)$
(b) 10 km and $\tan^{-1}(\sqrt{5})$
(c) $\sqrt{52}$ and $\tan^{-1}(5)$
(d) $\sqrt{52}$ km $\tan^{-1}(\sqrt{5})$
12. projectile is thrown in the upward direction making an angle of 60° with the horizontal direction with a velocity of 147 ms^{-1} . The time after which its inclination with the horizontal of 45° is
- (a) 15 s
(b) 10.98 s
(c) 5.49s
(d) 2.745s
13. When light of wavelength of 4000 \AA is incident on a metal surface of 2 eV work function, the kinetic energy of emitted photo-electrons will be
- (a) 0.5 eV
(b) 1.1 eV
(c) 2.5 eV
(d) 5 eV
14. In the equation $Y = A \sin(\omega t - kx)$, the dimension formula of k is
- (a) $[M^{-1} L T^{-1}]$
(b) $[M^0 L^1 T^0]$
(c) $[M^0 L^{-1} T^0]$
(d) $[M^0 L^{-1} T^{-1}]$
15. The work done in blowing a soap bubble of radius 0.2 m, given that the surface tension of soap solution is $60 \times 10^{-3} \text{ N/M}$ is:
- (a) $24 \pi \times 10^{-4} \text{ J}$
(b) $48 \pi \times 10^{-4} \text{ J}$
(c) $96 \pi \times 10^{-4} \text{ J}$
(d) $1.92 \pi \times 10^{-4} \text{ J}$
16. A fish in an aquarium, 30 cm deep in water can see a light bulb kept 50 cm above the surface of water. The fish can also see the image of this bulb in the

- reflecting bottom surface of the aquarium. Total depth of water is 60 cm. Then the apparent distance between the two images seen by the fish is ($\mu_w = 4/3$)
- (a) 140 cm
(b) $(760/3)$ cm
(c) $(280/3)$ cm
(d) $(380/3)$ cm
17. A man can see two poles separately from a distance of 10 km. The minimum distance between the poles should be
- (a) 1m
(b) 2m
(c) 3m
(d) 4m
18. If a spherical ball rolls on a table without slipping the fraction of its total energy associated with rotational energy is:
- (a) $3/5$
(b) $2/7$
(c) $2/5$
(d) $3/7$
19. Two particles having same amplitude and frequency execute simple harmonically parallel to x – axis about the origin. At a certain instant the particles are found to be at a distance $A/2$ from the origin, in opposite sides and their velocities are in same direction. Find the phase difference between the two.
- (a) 45
(b) 135
(c) 60
(d) 120

20. A pendulum (simple) is oscillating between extreme positions A and B about the mean position 'O'. Which of the following statements are true?

- I. The tension is maximum at A or B and minimum at O.
- II. The tension in the string is maximum at O and minimum at A or B.
- III. The acceleration in the string is constant throughout the oscillation.
- IV. At point 'O', the acceleration of the bob is not zero.

- (a) Only I and III
- (b) Only II and IV
- (c) I, III and IV
- (d) II, III and IV

21. In Millikan's oil drop experiment, the terminal speed of a drop of radius 2.0×10^{-5} m and density 1.2×10^3 kg/m³. Viscosity of air at the temperature of the experiment is 1.8×10^{-5} NS m⁻². How much is the viscous force on the drop at that speed? Neglect the buoyancy of the drop due to air.

- (a) 2.38×10^{-10} N
- (b) 4.95×10^{-10} N
- (c) 5.8×10^{-10} N
- (d) 3.93×10^{-10} N

22. Which of the following are true regarding relations between Y, K, η and σ ?

(i) $\eta = \frac{Y}{2(1+\sigma)}$

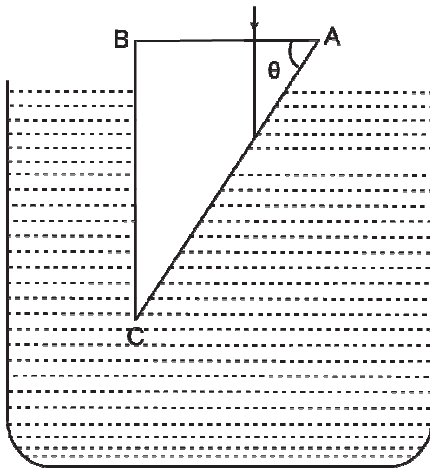
(ii) $\frac{9}{Y} = \frac{3}{\eta} - \frac{1}{K}$

(iii) $\sigma = \frac{3K+2\eta}{6K+2\eta}$

(iv) $K = \frac{Y}{3(1-2\sigma)}$

- (a) (i), (ii) and (iv)

- (b) (i) (ii) and (iii)
(c) (i) and (iv)
(d) (i) and (iii)
23. Two vectors of same magnitude have a resultant equal to either, then the angle between the vectors will be
- (a) 30°
(b) 60°
(c) 90°
(d) 120°
24. The displacement of a particle varies with time t as $x = ae^{-\alpha t} + be^{\beta t}$, where a , b , α and β are positive constants. The velocity of the particle will
- (a) go on decreasing with time
(b) be independent of α and β
(c) drop to zero when $\alpha = \beta$
(d) go on increasing with time
25. A stationary wave $Y=0.4 \sin (2\pi/40)x \cos 100\pi t$ is produced in a rod fixed at both ends. The minimum possible length of the rod is given by
- (a) 10 m
(b) 22 m
(c) 20 m
(d) 28 m
26. A glass prism of refractive index 1.5 is immersed in water ($\mu = 4/3$). Refer figure.



A light beam incident normally on the face AB is totally reflected to reach the face BC, if

- (a) $2/3 < \sin \theta < 8/9$
- (b) $\sin \theta \leq 2/3$
- (c) $\cos \theta \geq 8/9$
- (d) $\sin \theta > 8/9$

27. A body is moving along a straight line by a machine delivering a constant power. The distance moved by the body in time 't' is proportional to

- (a) \sqrt{t}
- (b) $t^{3/4}$
- (c) $t^{3/2}$
- (d) t^2

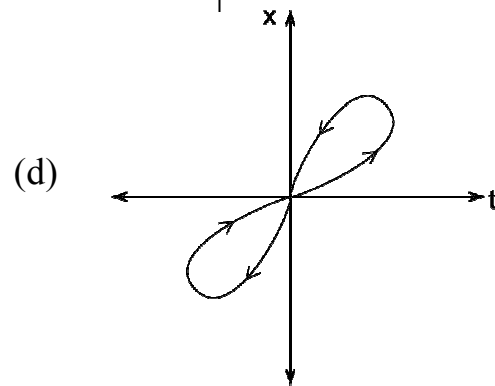
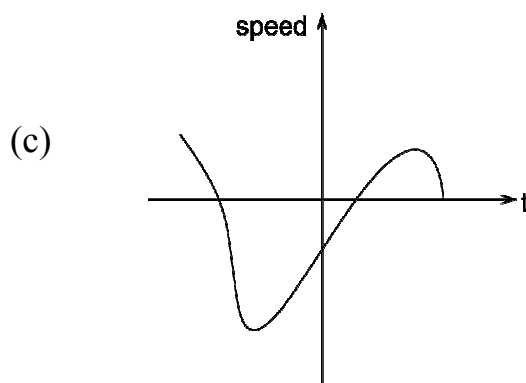
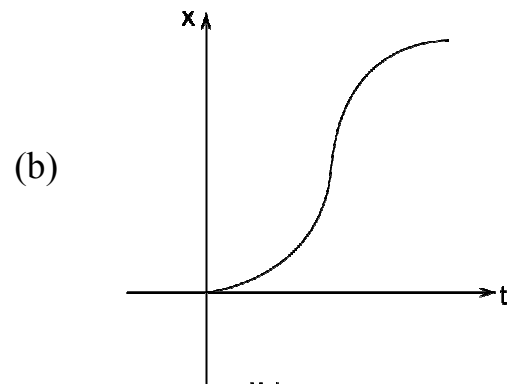
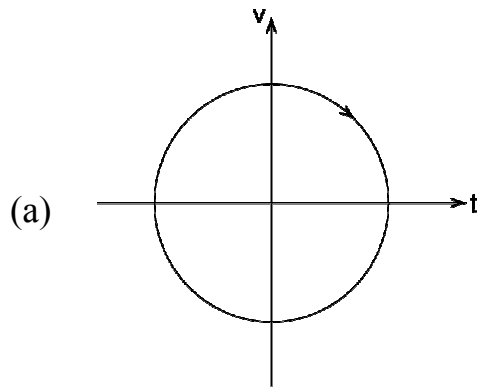
28. In a streamline flow

- (a) the speed of a particle always remains same
- (b) the velocity of a particle always remains same
- (c) the kinetic energies of all particles arriving at a given point are the same
- (d) the moment of all the particles arriving at a given point are the same

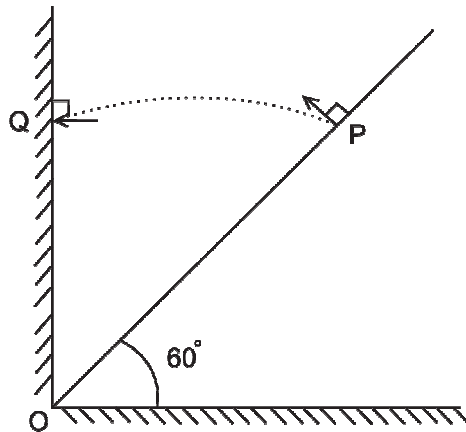
29. The mass and diameter of a planet are three times those of earth. If a seconds pendulum is taken to it, what will be the time period ?

- (a) $1/\sqrt{3}$ sec
- (b) $2\sqrt{3}$
- (c) 3 sec
- (d) 9 sec

30. Which of the following graphs represents one dimensional motion of a particle ?



31.



From point P, a particle is projected with a velocity of 40 m/s perpendicular to the inclined plane and also strikes perpendicularly at point Q. Find the time taken by the particle in moving from P to Q.

- (a) 4s
 - (b) 2s
 - (c) 5s
 - (d) 6s
32. The velocity of a particle at any instant t is given by, $V = pt^2 + qt$. The dimensions of p is
- (a) $[M^1L^2T^{-2}]$
 - (b) $[M^0L^2T^{-3}]$
 - (c) $[M^0L^1T^{-3}]$
 - (d) $[M^1L^2T^{-3}]$
33. n particles each of equal mass m gram are placed on the same line at distance $\ell, 2\ell, 3\ell \dots n\ell$ on from a fixed point. The distance of centre of mass of the particle from the fixed point in centimeter is
- (a) $\frac{m\ell}{2}(n+1)$
 - (b) $\frac{mn(n+1)}{2}$
 - (c) $\frac{\ell}{2}(n+1)$

(d) $\frac{mn\ell(n+1)}{2}$

34. Potential energy of a particle of mass 2 kg moving freely along x-axis is

given by $v(x) = \left(\frac{x^3}{3} - \frac{3x^2}{4} \right) \text{J}$. If the mechanical energy of the particle is 5J,

then the maximum speed is

(a) 9 m/s

(b) $\frac{\sqrt{17}}{4} \text{ m/s}$

(c) 5 m/s

(d) $\frac{\sqrt{89}}{4} \text{ m/s}$

35. Two identical capacitors of capacitance 'C' connected to potential V_1 and V_2 respectively. The decrease in energy of combined system if the negative ends are connected is

(a) $\frac{1}{2}C(V_1^2 - V_2^2)$

(b) $\frac{1}{2}C(V_1 - V_2)^2$

(c) $\frac{1}{4}C(V_1^2 - V_2^2)$

(d) $\frac{1}{4}C(V_1 - V_2)^2$

36. Which of the following is true about a fuse wire?

(a) low resistivity and low melting point

(b) low resistivity and high melting point

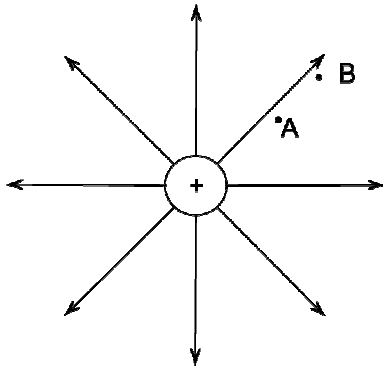
(c) high resistivity and low melting point

(d) high resistivity and high melting point

37. The resistance of series combination of 2 resistors is S . When they are joined in parallel, the total resistance is P . If $S = nP$, the minimum possible value of n is

- (a) 1
- (b) 2
- (c) 3
- (d) 4

38. Figures given below show the electric lines of force of positive and negative charge respectively.



Which of the following statements are correct?

- (a) $V_P > V_Q$
- (b) $V_A > V_B$
- (c) $(P.E)_Q > (P.E)_P$
- (d) $(P.E)_A > (P.E)_B$

39. Which of the following is true during a nuclear fusion reaction?

- (a) a heavy nucleus breaks into two fragments
- (b) two light nuclei combine to give a heavy nucleus
- (c) a heavy nucleus bombarded by thermal neutrons breaks up
- (d) it is a chain process

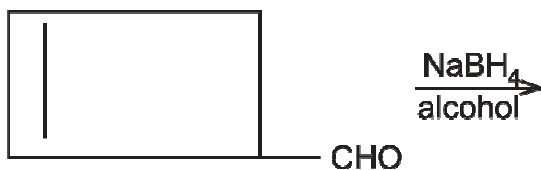
40. Water is kept in a tank upto a height of h metre. It is to be emptied through a small hole at the bottom. Find the ratio of time taken by water from height h to $(h/3)$ and from $(h/3)$ to zero.

- (a) $\sqrt{3} + 1$
(b) $\sqrt{3} - 1$
(c) $1 - \sqrt{3}$
(d) $\sqrt{3} - 2$
41. Which of the following relation is true regarding phase difference and path difference ?
- (a) $\Delta\phi = \frac{2\pi}{\lambda}(\Delta x)$
(b) $\Delta\phi = \frac{2\Delta x}{\lambda}$
(c) $\Delta\phi = 2\pi\lambda(\Delta x)$
(d) $\Delta\phi = \frac{4\pi\lambda}{\Delta x}$
42. Two travelling waves $y_1 = a \sin[k(x + pt)]$ and $y_2 = a \sin[k(x - pt)]$ are superposed on a string. The distance between adjacent antinodes is
- (a) $\frac{pt}{2\pi}$
(b) $\frac{\pi}{2k}$
(c) $\frac{\pi}{k}$
(d) $\frac{pT}{\pi}$
43. Three masses 2, 3 and 4 kg are located at the corners of an equilateral triangle of side 2m. The centre of mass of the system is
- (a) (0.77, 1.11)
(b) (1.11, 0.77)
(c) (1.77, 0.11)
(d) (0.11, 1.77)

44. A ball thrown up is caught by the thrower after 4 s. How high did it go and with what velocity was it thrown? How far was it below the highest point 3 s after it was thrown?
- (a) 19.6 m, 19.6 m/s, 4.9 m
 (b) 9.8 m, 19.6 m/s, 5.3 m
 (c) 19.6 m, 10 m/s, 4.8 m
 (d) 10 m, 9.8 m/s, 10 m
45. The binding energy per nucleon of ^{16}O is 7.97 MeV and that of ^{17}O is 7.75 MeV. The energy in MeV required to remove a neutron from ^{17}O is
- (a) 4.23
 (b) 3.57
 (c) 6.38
 (d) 5.97

CHEMISTRY

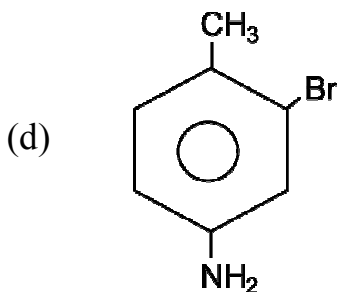
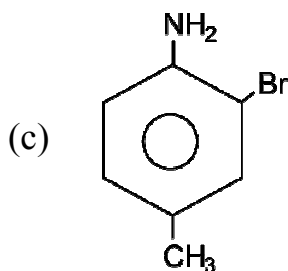
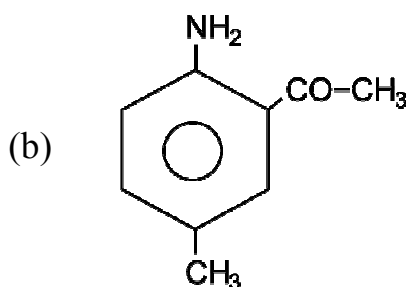
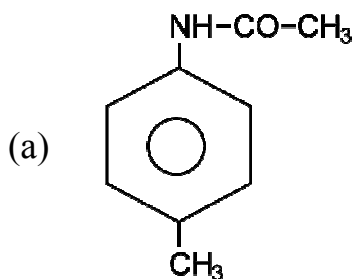
46. What is the product of reaction?



47. A neutral white salt of sodium (A) on heating liberates a gas leaving a highly alkaline residue (B). The gas (X) is colorless and turns the solution of $\text{Ca}(\text{OH})_2$ milky. Which of the following is true?

- (a) A is NaHCO_3
- (b) A is Na_2CO_3
- (c) A is Na_2SO_4
- (d) None of these

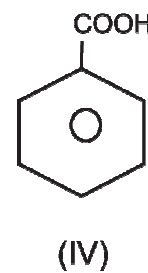
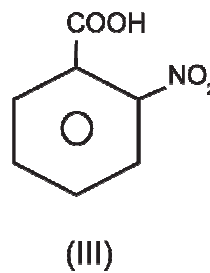
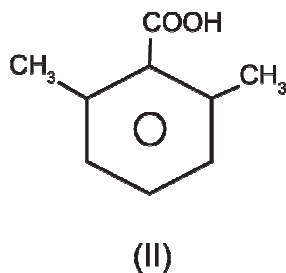
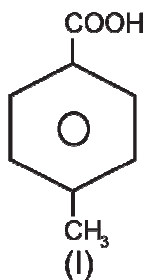
48. p-Toluidine is treated with acetic anhydride and acetic acid to form a compound A. The compound "A" then reacts with Br_2 to form B which on hydrolysis forms a compound 'C'. Identify the compound "C".



49. A 300gm ball is thrown with a speed of 3×10^5 cm/sec. What will be its de Broglie's wave length?

- (a) 7.36×10^{-34}
- (b) 7.36×10^{-35}
- (c) 0.736×10^{-35}
- (d) 7.36×10^{-36}

50. The correct decreasing order of acidity of the following compounds is

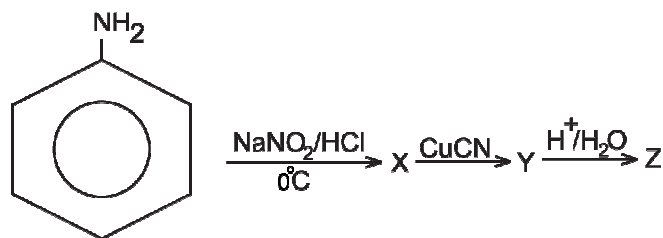


- (a) III>II>IV>I
 (b) III>IV>I>II
 (c) III>IV>II>I
 (d) II>III>IV>I
51. Cellulose, the polysaccharide is composed of
- (a) Straight chain of glucose molecules linked by α (1 – 6) glycosidic bonds.
 (b) Branched chain of glucose molecules linked by α (1– 4) glycosidic bonds.
 (c) Straight chain of glucose molecules linked by β (1 – 4) glycosidic bonds.
 (d) None of these
52. SiCl_4 is hydrolysed but CCl_4 is not hydrolyzed in water due to following reason.
- (a) SiCl_4 is ionic where CCl_4 is covalent in nature
 (b) Carbon has maximum covalency of four while the covalency of silicon is five
 (c) Due to six covalency of silicon, it can co-ordinate with water and thus easily gets hydrolysed
 (d) None of these
53. Acetyl chloride on treatment with excess of methyl magnesium chloride will produce
- (a) Acetone
 (b) Tertiary butyl alcohol

- (c) Isopropyl alcohol
(d) Acid
54. In a reaction $3A \rightleftharpoons B$, 1.0 mole of A was taken in a one litre flask and allowed to attain equilibrium. At equilibrium, concentration of B was found to be thrice the concentration of A. What is the equilibrium constant of the reaction?
- (a) 300
(b) 150
(c) 200
(d) 250
55. The concentration of a reactant decreases from 1600 mol L^{-1} to 100 mol L^{-1} in $3 \times 10^3 \text{ s}$ of a first order reaction. What will be the rate constant in sec^{-1} ?
- (a) 8×10^{-3}
(b) $.693 \times 10^{-3}$
(c) 0.924×10^{-3}
(d) 1.2×10^{-3}
56. The enthalpy of vaporization of water is 40.73 kJ permole . The entropy of vaporization is $109 \text{ Jk}^{-1}\text{mol}^{-1}$. At what temperature the water is in equilibrium with water vapours?
- (a) 373.67°C
(b) 100.67°C
(c) 273.67 K
(d) 99.5°C
57. A compound of a metal ion (M^{x+}) has a spin only magnetic moment of $\sqrt{8}$ Bohr magnetons. The number of unpaired electrons in the compound are ($Z = 28$)
- (a) 0
(b) 1
(c) 2

- (d) 3
58. Calculate the electrode potential for, $\text{Ag}_{(s)} - \text{AgCl}_{(s)}$ electrode immersed in 0.1 N KCl at 298 K.
- Given K_{sp} of $\text{AgCl} = 1.8 \times 10^{-9}$ and $E_{\text{Ag}^+/\text{Ag}}^0 = 0.8 \text{ V}$
- (a) 0.34 V
(b) 0.53 V
(c) 0.79 V
(d) 0.84 V
59. Which substance is used as Holmes signals for the ship?
- (a) CaC_2
(b) CaC_2 & Ca_3P_2
(c) Ca_3P_2 and C_2H_6
(d) None of the above
60. At what temperature, the kinetic energy of 6 gms of oxygen is equal to the kinetic energy of 0.5 mole of methane at 27°C ?
- (a) 600K
(b) 800°C
(c) 800K
(d) 600°C
61. Which of the following ores is not concentrated by froth flotation process?
- (a) Copper pyrite
(b) Zinc blende
(c) Siderite
(d) Argentite
62. Which one is the strongest acid of the following?
- (a) HClO_4
(b) HClO_3
(c) HClO_2
(d) HClO

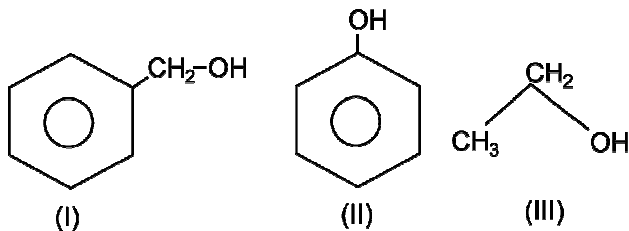
63. The polymerized product of acetylene with HCN in the ratio of 2:1 in a red hot tube forms
- (a) Piperidine
 - (b) Pyridine
 - (c) Thiophene
 - (d) Ethyl cyanide
64. What is the pH of the resultant solution when 500 ml of 0.05 M HCl is mixed with 200 ml of 0.1 M NaOH solution?
- (a) $5 - \log 7$
 - (b) $6 - \log 7$
 - (c) $3 - \log 7$
 - (d) $3 + \log 7$
65. A compound with molecular formula C_8H_{18} shows optical isomerism, the compound will be
- (a) 4-Methylheptane
 - (b) 2, 2-Dimethylhexane
 - (c) 2, 3-Dimethylhexane
 - (d) It does not show optical isomerism.
66. Predict the product 'Z' from the conversion
- $$C_3H_6 \xrightarrow{Cl_2} X \xrightarrow{alc.KOH} Y \xrightarrow[HgSO_4]{H_2SO_4} Z.$$
- (a) Propyne
 - (b) Propyl chloride
 - (c) Propanal
 - (d) Propanone
67. In the sequence of the reaction, identify the last product.



- (a) Benzaldehyde
 (b) Acetophenone
 (c) Benzonitrile
 (d) Benzoic acid
68. What happens when chloride gas is passed through molten sulphur?
- (a) Sulphur dichloride
 (b) Sulphur monochloride
 (c) Thionyl chloride
 (d) Sulphur hexachloride
69. Which of the following ions shows highest value of ionic radius?
- (a) Be^{2+}
 (b) B^{3+}
 (c) N^{3-}
 (d) F^-
70. Which of the following reaction gives a colloidal solution?
- (a) $2\text{K} + 2\text{H}_2\text{O} \rightarrow 2\text{KOH} + \text{H}_2$
 (b) $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2$
 (c) $2\text{HNO}_3 + 3\text{H}_2\text{S} \rightarrow 3\text{S} + 4\text{H}_2\text{O} + 2\text{NO}$
 (d) $\text{Cu} + \text{CuCl}_2 \rightarrow \text{Cu}_2\text{Cl}_2$
71. Acetone when heated with conc. H_2SO_4 gives
- (a) Triacetone
 (b) Mesitylene
 (c) Thiophene
 (d) Ethyl hydrogen sulphate
72. Which of the following statement is correct?

- (a) The melting point of sodium is more than that of lithium.
- (b) Atomic density decreases down the group.
- (c) Atomic radius of Cs is more than potassium.
- (d) Ionization energy of K is more than Na.

73. Consider three molecules



If the bond length of C–O bond in Str. (I) = x

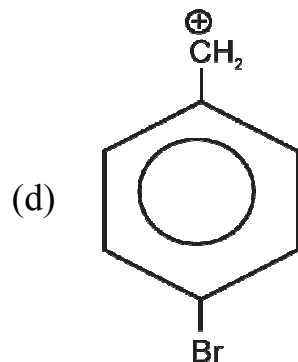
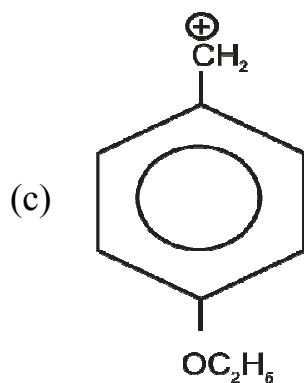
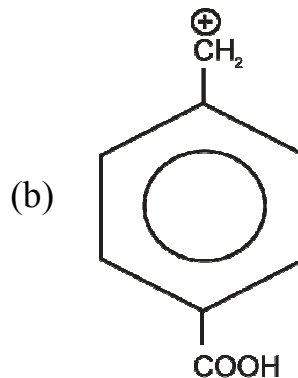
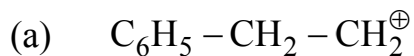
Str. (II) = y

Str. (III) = z,

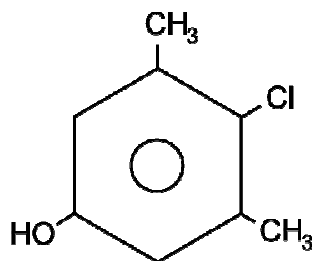
then which of the following is true?

- (a) $x = y$
 - (b) $y = z$
 - (c) $x < y$
 - (d) $y < z$
74. The spectral lines corresponding to radiation emitted by an electron jumps from higher orbit to 2nd orbit belong to
- (a) Lyman Series
 - (b) Balmer Series
 - (c) Paschen Series
 - (d) Bracket Series
75. Which of the following groups have only –M effect?
- (a) $-\text{Cl}$, $-\text{OH}$, $-\text{NO}_2$
 - (b) $-\text{NO}_2$, $-\text{CHO}$, $-\text{NH}_2$
 - (c) $-\text{CN}$, $-\text{COOH}$, $-\text{SO}_3\text{H}$
 - (d) $-\overset{\oplus}{\text{N}}\text{H}_3$, $-\text{OCH}_3$, $-\text{NO}_2$

76. Which of the following carbocations is least stable?



77.



is used as

- (a) Analgesics
- (b) Antibiotics
- (c) Antiseptics
- (d) Hypnotics

78. Dry powder fire extinguisher contains

- (a) Sand + Caustic soda
- (b) Sand + Washing soda
- (c) Sand + baking soda

- (d) Sand + potassium carbonate
79. Which of the following compounds has bond angle nearest to 90° ?
- (a) NH_3
(b) C_2H_2
(c) H_2O
(d) C_2H_4
80. The co-ordination number of platinum in the complex of the type $\text{K}_2[\text{PtCl}_6]$ is
- (a) 2
(b) 4
(c) 6
(d) 8
81. The cell reaction of a cell is
- $$\text{Mg}_{(s)} + \text{Cu}_{(aq)}^{++} \rightarrow \text{Cu}_{(s)} + \text{Mg}_{(aq)}^{2+}$$
- If $E_{\text{Mg}/\text{Mg}^{++}}^0 = -2.37 \text{ V}$ $E_{\text{Cu}^{++}/\text{Cu}}^0 = +0.34$
- the emf of cell
- (a) 1.97 V
(b) 2.71 V
(c) -2.71 V
(d) -2.03 V
82. The excluded volume per molecule given in the Vander Waal's equation is equal to
- (a) $(4/3) \pi d^3$ where d is the molecular diameters
(b) $2 \times (4/3) \pi r^3$ where d is the molecular diameters
(c) $4 \times (4/3) \pi r^3$
(d) $N_A \times b$
83. An alkene with molecular formula C_5H_{10} on oxidation with hot KMnO_4

solution gives only $\text{HO} - \overset{\text{O}}{\parallel}{\text{C}} - (\text{CH}_2)_3 - \overset{\text{O}}{\parallel}{\text{C}} - \text{OH}$. The alkene is

- (a) Pent – 1 – ene
(b) Pent – 2 – ene
(c) Methyl cyclobutene
(d) Cyclopentene
84. X_2Y is a compound having cation x^+ and y^{2-} . If the solubility of X_2Y is “a” mol/litre then its K_{SP} is
- (a) a^3
(b) $a^2/2$
(c) $4a^2$
(d) $4a^3$
85. 30 ml of 0.1 M HCl is mixed with 30ml of 0.1 N NaOH solution, the pH of the solution will be
- (a) 6
(b) 1
(c) 7
(d) 9
86. The elements with atomic numbers 8, 16, 34, A, 84 respectively. What will be the atomic number of “A”?
- (a) 42
(b) 52
(c) 54
(d) 50
87. The number of atoms in 0.24g of ozone is close to
- (a) 12.01×10^{21}
(b) 3.01×10^{21}
(c) 6.2×10^{21}
(d) 9.03×10^{21}
88. Ethane reacts with Cl_2 in presence of sunlight to produce 'A' which reacts with alc. KCN to form 'B'. B is hydrolyzed to form 'C'. What is the structure of C?

- (a) $\text{CH}_3\text{CH}_2\text{CN}$
(b) $\text{CH}_3\text{CH}_2\text{COOH}$
(c) $\text{CH}_3\text{CH}_2\text{COOCH}_3$
(d) $\text{CH}_3\text{CH}_2\text{CONH}_2$
89. Acidic hydrolysis of methyl cyanide and subsequent treatment with Br_2 in presence of red P yields
- (a) CH_3COBr
(b) $\text{BrCH}_2\text{CONH}_2$
(c) $\text{CH}_3\text{CH}_2\text{NHBr}$
(d) BrCH_2COOH
90. Which one of the following statements is incorrect with regard to ortho and para dihydrogen?
- (a) They are nuclear spin isomers.
(b) The ortho isomer has zero nuclear spin whereas the para isomer has one nuclear spin.
(c) The para isomer is favoured at low temperatures.
(d) The thermal conductivity of the para isomer is 50% greater than that of the ortho isomer.

BOTANY

91. The superiority of a hybrid over either of its parent plants from which it is produced is called:
- (a) Hybrid vigor
(b) Epistasis
(c) Heterosis
(d) Both a & c
92. The quicker way of crop improvement is plant introduction. What is true about plant variety introduced into India:
- (a) Ridley - Wheat

- (b) Bonneville - Pea
(c) Sioux - Tomato
(d) All of these
93. Find out the incorrect match:
- (a) Sonera-64, Lermarajo - Mutant wheat variety
(b) Ramei & Atomita - Mutant rice variety
(c) Aruna - Mutant castor variety
(d) None of these
94. Todd's Mitcham is a mutant variety of:
- (a) Castor
(b) Barley
(c) Peppermint
(d) Wheat
95. Bruise resistance tomato & Flavr savr tomato varieties are the product of :
- (a) Genetic engineering
(b) Antisense RNA tech
(c) Recombinant DNA tech
(d) None of these
96. What is true about genetically engineered microorganism (GEM), *Pseudomonas putida* (Super bug) :
- (a) Causes degradation of spilled oil
(b) Carry out degradation of alkyl benzoate
(c) Contains *gef*-Gene of *E. coli* origin
(d) All of these
97. Edible vaccine against diarrhoea & cholera could be produced in :
- (a) Potato
(b) Tomato
(c) Tobacco
(d) Turnip
98. Phytochrome helps in photosensitive processes like:
-

- (a) Seed germination in photoblastic seeds
(b) Synthesis of anthocyanin
(c) Root initiation & membrane permeability
(d) All of these
99. Type of germination that involves germination of seed inside the fruit itself is called:
- (a) Epigeal
(b) Hypogeal
(c) Viviparous
(d) None of these
100. The color of pericarp of wheat is either deep red, light red or colorless and such coloration is regulated by two genes C_1 and C_2 . Presence of both C_1 & C_2 caused deep red coloration, either C_1 or C_2 causes light red coloration and absence of C_1 and C_2 makes the pericarp colorless. This proves the principle of:
- (a) Incomplete dominance
(b) Codominance
(c) Polygenic or quantitative inheritance
(d) Multiple allelism
101. An *E. coli* which was about to replicate is placed in a medium containing radioactive thymidine (H^3 -tdR) for a few minutes. Which of the following observation shall be correct with regard to the DNA of daughter bacteria:
- (a) Both strands of DNA in daughter bacteria will be radioactive
(b) One strand of DNA in daughter bacteria will be radioactive
(c) Either strand of DNA in daughter bacteria will be half radioactive
(d) No strands of DNA in daughter bacteria will be radioactive
102. Isolated chlorophyll pigments appear red in color since:
- (a) They reflect back red light
(b) They cannot utilize red light

- (c) Fluorescence
(d) Photorespiration
103. Oxygen is required in aerobic respiration for:
- (a) Oxidation of glucose
(b) Production of ATP
(c) Grounding of electron
(d) All of these
104. In a panicle of spikelets as observed in family Poaceae, the flowers are found associated with structures like palea and lemma. Palea represents dry bracteole where as lemma represents :
- (a) Epicalyx
(b) Dry bract
(c) Tendril
(d) Stipule
105. Liquorice (*Glycyrrhiza glabra*) is a member of family :
- (a) Fabaceae
(b) Papilionaceae
(c) Liliaceae
(d) Caesalpiniaceae
106. Water absorption cannot take place when:
- (a) Soil water conc. found below PWP
(b) Soil water conc. found above field capacity (FC)
(c) Soil water conc. found equal to PWP
(d) All of these
107. Physiological drought when plants are unable to absorb appreciable amount of water, even though the soil contains enough water. It is observed under conditions like:
- (a) Presence of excess salt or fertilizers in soil
(b) Lack of soil aeration due to muddy soil
(c) Low soil temperature

- (d) All of these
108. Which of the following is not a parasitic fungus?
- (a) *Puccinia*
 - (b) *Agaricus*
 - (c) *Alternaria*
 - (d) *Phytophthora*
109. Isogamy, anisogamy and oogamy type of sexual reproductions are found in:
- (a) *Laminaria*
 - (b) *Polysiphonia*
 - (c) *Ulva*
 - (d) *Chlamydomonas*
110. Fairly good yields of rice can be had over a number of years without adding any nitrogenous manure, because
- (a) Rice plants do not require any nitrogen
 - (b) They require very minute quantities of nitrogen
 - (c) Their roots have nitrogen fixing bacteria
 - (d) Rice fields usually have large populations of cyanobacteria
111. Among the following, the molecule that would experience least resistance for entering a cell would be:
- (a) NaCl
 - (b) Glucose
 - (c) Fatty acid
 - (d) Amino acid
112. Dinomitosis is found in:
- (a) Prokaryotes
 - (b) Mesokaryotes
 - (c) Eukaryotes
 - (d) Viruses
113. Which of the following methods for transporting substances across a membrane does not involve a change in shape of the transport protein?

- (a) Facilitated diffusion
 - (b) Active transport
 - (c) Simple diffusion
 - (d) Osmosis
114. Plasmodesmata in plant cells play roles except
- (a) Systemic spread of a virus
 - (b) Transfer of starch
 - (c) Movement of mineral ions
 - (d) Movement of water
115. For proving semiconservative mode DNA replication, Messelson and Stahl used all the followings EXCEPT:
- (a) $^{15}\text{NH}_4\text{Cl}$ in the growth medium
 - (b) Density gradient centrifugation
 - (c) *Escherichia coli*
 - (d) Radio-labelled thymidine
116. The book “Inborn errors of Metabolism” giving the idea that genes control the production of enzymes was written by:
- (a) Charles Darwin
 - (b) T.H. Morgan
 - (c) A.E. Garrod
 - (d) Arthur Kornberg
117. Polyadelphous stamens are found in genera except:
- (a) Bombax
 - (b) Pisum
 - (c) Citrus
 - (d) Ricinus
118. In the flowers of family Fabaceae, one of the following immediately encloses the stamens and carpel:
- (a) Ovary wall
 - (b) Wings

- (c) Keel
(d) Standard
119. Bilabiate corolla is found in:
- (a) *Hibiscus*
(b) *Salvia*
(c) *Dianthus*
(d) *Datura*
120. Persistent calyx is the characteristic of the genus:
- (a) *Papaver*
(b) *Argemone*
(c) *Brassica*
(d) *Solanum*
121. Heart wood of most woody trees fails to conduct sap due to the obstruction by:
- (a) Excess secondary wall deposition
(b) Tyloses storing a variety of materials
(c) Termites boring into it
(d) Deposits of reserved food materials
122. The length of different internodes in a culm of sugarcane is variable because of:
- (a) Position of axillary buds
(b) Shoot apical meristem
(c) Intercalary meristem
(d) Size of leaf lamina at the node below
123. One cannot age a tree by its rings if that tree is located in which of the following forests?
- (a) Tropical deciduous
(b) Tropical evergreen
(c) Temperate deciduous
(d) Temperate evergreen

124. Root haustoria are found in:

- (a) Orchid
- (b) Pothos
- (c) Monstera
- (d) Cuscuta

125. Leaf tendrils are found in:

- (a) Cucurbita
- (b) Vitis
- (c) Pisum sativum
- (d) Passiflora

126. Epidermis is formed from:

- (a) Phellogen
- (b) Procambium
- (c) Cambium
- (d) Protoderm

127. Scorpioid inflorescence is found in:

- (a) Dianthus
- (b) Tropaeolum
- (c) Heliotropium
- (d) Begonia

128. During germination of seeds, reserve mobilisation from endosperm to embryo does not take place in:

- (a) Rice
- (b) Orchids
- (c) Wheat
- (d) Castor

129. The number of elements proved to be essential for the completion of a plant's life cycle:

- (a) 11
- (b) 17

- (c) 26
(d) 92
130. Which of the following is not a common nitrogen-fixer in paddy fields?
- (a) *Oscillatoria*
(b) *Aulosira*
(c) *Rhizobium*
(d) *Anabaena*
131. In Angiosperms, the functional megaspore of a linear tetrad is the:
- (a) First nearest to the micropyle
(b) Second from the micropyle
(c) Third from the micropyle
(d) Fourth from the micropyle
132. The process of double fertilization was discovered by:
- (a) Strasburger
(b) Panchanan Maheswari
(c) Nawaschin
(d) Drouchet
133. In a typical angiosperm anther, 1000 pollen grains were found in each pollen sac. How many meiotic divisions would have occurred in the microspore mother cells of the anther before the pollens were formed?
- (a) 2500
(b) 1000
(c) 250
(d) 100
134. Male gametes in angiosperms are formed by the division of:
- (a) Vegetative cell
(b) Microspore
(c) Microspore mother cell
(d) Generative cell

135. Which of the following is called Imino acid?

- (a) Proline
- (b) Valine
- (c) Glycine
- (d) Leucine

ZOOLOGY

136. Which process is absent in viruses

- (a) Replication
- (b) Mutation
- (c) Protein synthesis
- (d) Energy liberation

137. The body cavity with only one opening is known as

- (a) Coelenteron
- (b) Coelom
- (c) gastrovascular cavity
- (d) both a & c

138. Which is not a typical mammalian character?

- (a) Seven cervical vertebrae
- (b) Thecodont dentition
- (c) Ten Pairs of cranial nerves
- (d) Alveolar lungs

139. Gambusia is a

- (a) parasitic fish
- (b) pest of fishes
- (c) fish predator of mosquito larvae
- (d) a mosquito

140. A snake that builds nest is

- (a) Marine and poisonous
- (b) Terrestrial and Poisonous

- (c) Terrestrial and non-poisonous
(d) Fresh water and non- poisonous
141. Which of the following help move the oocyte into and through the uterine tube
- (a) Fimbriae
(b) Flagellae
(c) Cilia
(d) both a and c
142. Sustentacular cells produce
- (a) Estrogen
(b) LH
(c) Androgen-binding protein
(d) FSH
143. All the following are sympathetic responses during sexual intercourse except
- (a) Erection of penis/clitoris
(b) Ejaculation
(c) Uterine peristalsis
(d) Increased BP
144. Corpus luteum secretes all excepting
- (a) Relaxin
(b) Oestrogen
(c) Progesterone
(d) LH
145. Alcohol consumption results in
- (a) Oligouria
(b) Anuria
(c) Dieresis
(d) None

146. Which of the sexually transmitted diseases is correctly matched with its pathogen?
- (a) Urethritis - Bacillus anthracis
 - (b) Syphilis - Treponema pallium
 - (c) Gonorrhoea - Entamoeba histolytica
 - (d) Soft sore - Bacillus brevis
147. Technique used for estimating the amount of drug and hormone is
- (a) Radio-immuno assay
 - (b) Fractionation
 - (c) Centrifugation
 - (d) Sedimentation
148. Which of the following is not a lymphoid tissue
- (a) Spleen
 - (b) Tonsils
 - (c) Appendix
 - (d) Thymus
149. Heat kills all organisms is the process called:
- (a) Immunity
 - (b) Pasturisation
 - (c) Sterilization
 - (d) None of the above
150. The 1st clinical gene therapy was done for the treatment of:
- (a) AIDS
 - (b) Cancer
 - (c) Cystic fibrosis
 - (d) SCID
151. ADA is an enzyme whose deficiency causes Severe Combined Immuno Deficiency. Its full form is
- (a) Adenosine deoxy aminase
 - (b) Adenosine deaminase

- (c) Aspartate deaminase
(d) Arginine deaminase
152. Mitochondria are different from plastids in
- (a) Containing DNA
(b) Containing RNA
(c) Containing Ribosomes
(d) not containing chlorophyll
153. Which of the following is not the function of a cytoskeleton
- (a) Transport
(b) Shape and size
(c) Support
(d) motility
154. Which of the following is used for observing spindle fibres?
- (a) Dark field microscope
(b) phase contrast microscope
(c) Polarization microscope
(d) Scanning electron microscope
155. The longest phase in of meiosis is
- (a) Metaphase I
(b) Prophase I
(c) Anaphase I
(d) Telophase I
156. The word ecosystem was coined by
- (a) Weaver & Clements
(b) A.G. Tansley
(c) R. Mishra
(d) E.P. Odum
157. Ecosystem has two components
- (a) Plants & animals
(b) Biotic & abiotic
(c) Weeds & trees

- (d) None of the above
158. What is common for Lantana, Eichornia and African catfish?
- (a) All are endangered
 - (b) All are key stone species
 - (c) All are mammals
 - (d) All are exotic and not threatened
159. A loss or gain of chromosomal material
- (a) Has no effect on the organism
 - (b) Can have serious effects
 - (c) Has greater effect on plants
 - (d) None of the above
160. In sickle cell anaemia glutamic acid is replaced by valine. What is the triplet code of valine?
- (a) GGG
 - (b) AAG
 - (c) GAA
 - (d) GUG
161. If Meselson and Stahl's experiment is continued for four generations in bacteria, the ratio of N^{15}/N^{15} , N^{15}/N^{14} , N^{14}/N^{14} containing DNA in fourth generation would be
- (a) 1:1:0
 - (b) 1:4:0
 - (c) 0:1:3
 - (d) 0:1:7
162. The amino acid attaches to the tRNA at it's
- (a) 5'-end
 - (b) 3'-end
 - (c) Anticodon site
 - (d) DHU loop
163. Cobra venom kills a victim due to exhaustion as it inhibits

- (a) Respiration
 - (b) The enzyme acetyl cholinesterase
 - (c) The nerve conduction
 - (d) Heart beat
164. Melatonin is secreted by
- (a) Pituitary
 - (b) Pineal
 - (c) Thyroid
 - (d) Adrenal medulla
165. In any autonomic pathway the pre-ganglionic fibres are always
- (a) Sensory
 - (b) Motor
 - (c) Mixed
 - (d) Not clear
166. Which of the following organs is involved in elicitation of the immune responses?
- (a) Thymus
 - (b) Brain
 - (c) Spleen
 - (d) Lungs
167. Myelin sheath is a layer of covering
- (a) Vertebrate nerve fibres
 - (b) Vertebrate muscle fibre
 - (c) Insect nerve fibre
 - (d) Chick embryo
168. Chief function of lymph nodes is to
- (a) Destroy old RBCs
 - (b) Produce hormones
 - (c) Produce WBCs
 - (d) Collect and destroy pathogens
169. Fibrinogen is a substance found in

- (a) Blood & produced in liver
 - (b) Bile & produced in liver
 - (c) Blood & produced in RBC
 - (d) Bone & produced in bone marrow
170. If the gall bladder of human being is removed
- (a) Acidity in duodenum will not decrease
 - (b) Fat digestion is not possible
 - (c) Effect of pancreatic juice upon food is impaired
 - (d) All of the above
171. Bile salts help in
- (a) excretion of fat
 - (b) Digestion of fat
 - (c) Absorption of fat
 - (d) Both digestion and absorption of fat
172. Sertoli cells are found
- (a) between the seminiferous tubules
 - (b) in the germinal epithelium of the seminiferous tubules
 - (c) in the germinal epithelium of ovary
 - (d) in the upper part of the fallopian tube
173. When a man inhales air containing normal concentration of O₂ and CO, he suffers from suffocation because
- (a) CO affects the nerve of the lungs
 - (b) CO affects diaphragm and intercostal muscle.
 - (c) CO react with O₂ reducing its percentage in air.
 - (d) Haemoglobin combines with Co instead of O₂ and the product cannot dissociate.
174. During O₂ transportation, the oxyhaemoglobin at the tissue level liberates O₂ to the cells because
- (a) O₂ tension is high and CO₂ tension is low
 - (b) O₂ tension is low and CO₂ tension is high

- (c) O₂ concentration is low and CO₂ is high
(d) O₂ concentration is high and CO₂ is low
175. Between heme and globin molecule
- (a) Co-valent bond is present
(b) Co-ordinate bond is present
(c) Both (i) & (ii)
(d) None of the above
176. Urine turns to black when exposed to air that is a metabolic disorder and it is caused due to
- (a) Phenylalanine
(b) Homogentisic acid
(c) Tyrosine
(d) Valine replacing glutamine
177. Which one is the excretory organ in the following?
- (a) Choanocyte
(b) Solenocyte
(c) Archaeocyte
(d) Pinacocyte
178. What will happen if a bone is kept in 10% KOH solution for 3 days?
- (a) Break
(b) Dissolve
(c) Remain unchanged
(d) Become soft & elastic
179. At the end of long bones epiphyseal discs are present which are responsible for
- (a) formation of haversian canal
(b) Remodeling the shape of the bone
(c) Growth of thickness of bone
(d) Bone elongation
180. Biogas can be a good substitute for:
-

- (a) Fuel wood
- (b) Petroleum and oil
- (c) Coal
- (d) Charcoal