



ROYAL ACADEMY- RAJKOT

RENEET PAPER - 25

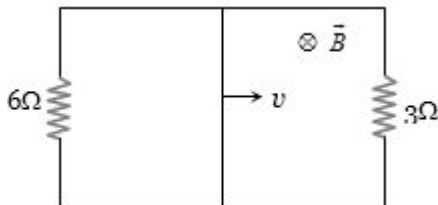
Marks : 720

Sub. : PCB(EM)

Date: 17.11.2024

Physics - Section A (MCQ)

- (1) The dimensions of magnetic flux are
(A) $MLT^{-2} A^{-2}$ (B) $ML^2T^{-2} A^{-2}$ (C) $ML^2T^{-1} A^{-2}$ (D) $ML^2T^{-2} A^{-1}$
- (2) A circular disc of radius 0.2 meter is placed in a uniform magnetic field of induction $\frac{1}{\pi} Wb/m^2$ in such a way that its axis makes an angle of 60° with \vec{B} . The magnetic flux linked with the disc is.....Wb
(A) 0.08 (B) 0.01 (C) 0.02 (D) 0.06
- (3) The magnetic flux linked with a coil is given by an equation ϕ (in webers) = $8t^2 + 3t + 5$. The induced *e.m.f.* in the coil at the fourth second will be.....units
(A) -16 (B) -39 (C) -67 (D) -145
- (4) A metal ring is held horizontally and bar magnet is dropped through the ring with its length along the axis of the ring. The acceleration of the falling magnet is
(A) Equal to g
(B) Less than g
(C) More than g
(D) Either (a) or (c)
- (5) A coil has 200 turns and area of $70cm^2$. The magnetic field perpendicular to the plane of the coil is $0.3Wb/m^2$ and takes 0.1 sec to rotate through 180° . The value of the induced *e.m.f.* will be.....V
(A) 84 (B) 8.4 (C) 42 (D) 4.2
- (6) The flux linked with a coil at any instant 't' is given by $\phi = 10t^2 - 50t + 250$ The induced emf at $t = 3$ s is.....V
(A) 10 (B) 190 (C) -10 (D) -190
- (7) A rectangular loop with a sliding connector of length $l = 1.0$ m is situated in a uniform magnetic field $B = 2$ T perpendicular to the plane of loop. Resistance of connector is $r = 2 \Omega$. Two resistance of 6Ω and 3Ω are connected as shown in figure. The external force required to keep the connector moving with a constant velocity $v = 2$ m/s is.....N

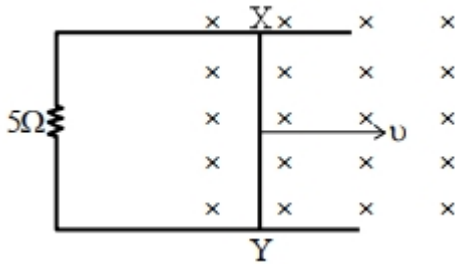


- (A) 6 (B) 4 (C) 2 (D) 1
- (8) A cycle wheel of radius 0.5 m is rotated with constant angular velocity of 10 rad/s in a region of magnetic field of 0.1 T which is perpendicular to the plane of the wheel. The *EMF* generated between its centre and the rim is.....V
(A) 0.25 (B) 0.125 (C) 0.5 (D) 0
- (9) A wire of length 1 m moving with velocity 8 m/s at right angles to a magnetic field of 2 T. The magnitude of induced emf, between the ends of wire will be V
(A) 20 (B) 8 (C) 12 (D) 16

(10) An *emf* of 0.08 V is induced in a metal rod of length 10 cm held normal to a uniform magnetic field of 0.4 T , when moves with a velocity of ms^{-1}

- (A) 2 (B) 3.2 (C) 0.5 (D) 20

(11) A 1 m long metal rod XY completes the circuit as shown in figure. The plane of the circuit is perpendicular to the magnetic field of flux density 0.15 T . If the resistance of the circuit is $5\ \Omega$, the force needed to move the rod in direction, as indicated, with a constant speed of 4 m/s will be 10^{-3} N



- (A) 9 (B) 45 (C) 16 (D) 18

(12) An *e.m.f.* of 5 volt is produced by a self inductance, when the current changes at a steady rate from 3 A to 2 A in 1 millisecond . The value of self inductance is

- (A) Zero (B) 5 H (C) 5000 H (D) 5 mH

(13) When the number of turns in a coil is doubled without any change in the length of the coil, its self inductance becomes

- (A) Four times (B) Doubled (C) Halved (D) Unchanged

(14) The current in self inductance $L = 40\text{ mH}$ is to be increased uniformly from 1 A to 11 A in 4 milliseconds . The *e.m.f.* induced in inductor during process is V

- (A) 0.4 (B) 4 (C) 440 (D) 100

(15) In a transformer, the coefficient of mutual inductance between the primary and the secondary coil is 0.2 henry . When the current changes by 5 ampere/second in the primary, the induced *e.m.f.* in the secondary will be..... V

- (A) 5 (B) 1 (C) 25 (D) 10

(16) Two conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 \gg R_2$, the mutual inductance M between them will be directly proportional to:

- (A) $\frac{R_1}{R_2}$ (B) $\frac{R_2}{R_1}$ (C) $\frac{R_1^2}{R_2}$ (D) $\frac{R_2^2}{R_1}$

(17) A 100 mH coil carries a current of 1 ampere . Energy stored in its magnetic field is..... J

- (A) 0.5 (B) 1 (C) 0.05 (D) 0.1

(18) The magnetic potential energy stored in a certain inductor is 25 mJ , when the current in the inductor is 60 mA . This inductor is of inductance H

- (A) 0.138 (B) 138.88 (C) 13.89 (D) 1.389

(19) A wire is loaded by 6 kg at its one end, the increase in length is 12 mm . If the radius of the wire is doubled and all other magnitudes are unchanged, then increase in length will be mm

- (A) 6 (B) 3 (C) 24 (D) 48

(20) Two wires of equal lengths are made of the same material. Wire A has a diameter that is twice as that of wire B . If identical weights are suspended from the ends of these wires, the increase in length is

- (A) Four times for wire A as for wire B (B) Twice for wire A as for wire B
(C) Half for wire A as for wire B (D) One-fourth for wire A as for wire B

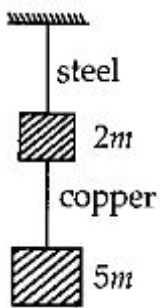
(21) A cube of aluminium of sides 0.1 m is subjected to a shearing force of 100 N . The top face of the cube is displaced through 0.02 cm with respect to the bottom face. The shearing strain would be

- (A) 0.02 (B) 0.1 (C) 0.005 (D) 0.002

(22) A 2 m long rod of radius 1 cm which is fixed from one end is given a twist of 0.8 radians. The shear strain developed will be

- (A) 0.002 (B) 0.004 (C) 0.008 (D) 0.016

- (23) One end of a uniform wire of length L and of weight W is attached rigidly to a point in the roof and a weight W_1 is suspended from its lower end. If S is the area of cross-section of the wire, the stress in the wire at a height $3L/4$ from its lower end is
 (A) $\frac{W_1}{S}$ (B) $\frac{W_1+(W/4)}{S}$ (C) $\frac{W_1+(3W/4)}{S}$ (D) $\frac{W_1+W}{S}$
- (24) A body of mass $m = 10$ kg is attached to one end of a wire of length 0.3 m. The maximum angular speed (in $rad\ s^{-1}$) with which it can be rotated about its other end in space station is (Breaking stress of wire = 4.8×10^7 Nm^{-2} and area of cross-section of the wire = 10^{-2} cm^2) is
 (A) 8 (B) 7 (C) 11 (D) 4
- (25) The length of an iron wire is L and area of cross-section is A . The increase in length is l on applying the force F on its two ends. Which of the statement is correct
 (A) Increase in length is inversely proportional to its length L
 (B) Increase in length is proportional to area of cross-section A
 (C) Increase in length is inversely proportional to A
 (D) Increase in length is proportional to Young's modulus
- (26) The dimensions of four wires of the same material are given below. In which wire the increase in length will be maximum when the same tension is applied
 (A) Length 100 cm, Diameter 1 mm (B) Length 200 cm, Diameter 2 mm
 (C) Length 300 cm, Diameter 3 mm (D) Length 50 cm, Diameter 0.5 mm
- (27) A beam of metal supported at the two ends is loaded at the centre. The depression at the centre is proportional to
 (A) Y^2 (B) Y (C) $1/Y$ (D) $1/Y^2$
- (28) The diameter of a brass rod is 4 mm and Young's modulus of brass is 9×10^{10} N/m^2 . The force required to stretch by 0.1% of its length is
 (A) $360\pi N$ (B) $36 N$ (C) $144\pi \times 10^3 N$ (D) $36\pi \times 10^5 N$
- (29) An aluminum rod (Young's modulus = 7×10^9 N/m^2) has a breaking strain of 0.2% . The minimum cross-sectional area of the rod in order to support a load of 10^4 Newton's is
 (A) 1×10^{-2} m^2 (B) 1.4×10^{-3} m^2 (C) 3.5×10^{-3} m^2 (D) 7.1×10^{-4} m^2
- (30) A steel wire of 1 m long and 1 mm^2 cross section area is hang from rigid end. When weight of 1 kg is hung from it then change in length will be given mm ($Y = 2 \times 10^{11}$ N/m^2)
 (A) 0.5 (B) 0.25 (C) 0.05 (D) 5
- (31) The mean distance between the atoms of iron is 3×10^{-10} m and interatomic force constant for iron is 7 N/m The Young's modulus of elasticity for iron is
 (A) 2.33×10^5 N/m^2 (B) 23.3×10^{10} N/m^2 (C) 233×10^{10} N/m^2 (D) 2.33×10^{10} N/m^2
- (32) A rubber cord 10 m long is suspended vertically. How much does it stretch under its own weight (Density of rubber is 1500 kg/m^3 , $Y = 5 \times 10^8$ N/m^2 , $g = 10$ m/s^2)
 (A) 15×10^{-4} m (B) 7.5×10^{-4} m (C) 12×10^{-4} m (D) 25×10^{-4} m
- (33) There are two wires of same material and same length while the diameter of second wire is 2 times the diameter of first wire, then ratio of extension produced in the wires by applying same load will be
 (A) $1 : 1$ (B) $2 : 1$ (C) $1 : 2$ (D) $4 : 1$
- (34) An elastic material of Young's modulus Y is subjected to a stress S . The elastic energy stored per unit volume of the material is
 (A) $\frac{2Y}{S^2}$ (B) $\frac{S^2}{2Y}$ (C) $\frac{S}{2Y}$ (D) $\frac{S^2}{Y}$
- (35) If the ratio of diameters, lengths and Young's modulus of steel and copper wires shown in the figure are p, q and s respectively, then the corresponding ratio of increase in their lengths would be



- (A) $\frac{5q}{7p^2s}$ (B) $\frac{7q}{5p^2s}$ (C) $\frac{2q}{5sp}$ (D) $\frac{7q}{5sp}$

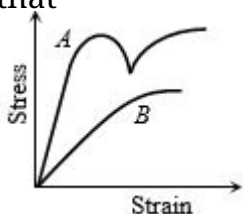
Physics - Section B (MCQ)

- (36) For a constant hydraulic stress on an object, the fractional change in the object's volume ($\frac{\Delta V}{V}$) and its bulk modulus (B) are related as
 (A) $\frac{\Delta V}{V} \propto B$ (B) $\frac{\Delta V}{V} \propto \frac{1}{B}$ (C) $\frac{\Delta V}{V} \propto B^2$ (D) $\frac{\Delta V}{V} \propto B^{-2}$
- (37) The density of a metal at normal pressure is ρ . Its density when it is subjected to an excess pressure p is ρ' . If B is Bulk modulus of the metal, the ratio of $\frac{\rho'}{\rho}$ is
 (A) $\frac{1}{1-\frac{p}{B}}$ (B) $1+\frac{p}{B}$ (C) $\frac{1}{1+\frac{p}{B}}$ (D) $1+\frac{B}{p}$
- (38) A cube of metal is subjected to a hydrostatic pressure of 4 GPa. The percentage change in the length of the side of the cube is close to.....%
 (Given bulk modulus of metal, $B = 8 \times 10^{10} Pa$)
 (A) 0.6 (B) 1.67 (C) 5 (D) 20
- (39) The ratio of lengths of two rods A and B of same material is 1 : 2 and the ratio of their radii is 2 : 1, then the ratio of modulus of rigidity of A and B will be
 (A) 4 : 1 (B) 16 : 1 (C) 8 : 1 (D) 1 : 1
- (40) A brass rod of cross-sectional area $1 cm^2$ and length $0.2 m$ is compressed lengthwise by a weight of $5 kg$. If Young's modulus of elasticity of brass is $1 \times 10^{11} N/m^2$ and $g = 10 m/sec^2$, then increase in the energy of the rod will be
 (A) $10^{-5} J$ (B) $2.5 \times 10^{-5} J$ (C) $5 \times 10^{-5} J$ (D) $2.5 \times 10^{-4} J$
- (41) For silver, Young's modulus is $7.25 \times 10^{10} N/m^2$ and Bulk modulus is $11 \times 10^{10} N/m^2$. Its Poisson's ratio will be
 (A) -1 (B) 0.5 (C) 0.39 (D) 0.25
- (42) Match List-I with List-II :

| List-I | List-II |
|--|----------------------|
| (A) A force that restores anelastic body of unit area to its original state | (I) Bulk modulus |
| (B) Two equal and opposite forces parallel to opposite faces | (II) Young's modulus |
| (C) Forces perpendicular everywhere to the surface per unit area same everywhere | (III) Stress |
| (D) Two equal and opposite force perpendicular to opposite faces | (IV) Shear modulus |

Choose the correct answer from the options given below:

- (A) (A) - (II), (B) - (IV), (C) - (I), (D) - (III) (B) (A) - (IV), (B) - (II), (C) - (III), (D) - (I)
 (C) (A) - (III), (B) - (IV), (C) - (I), (D) - (II) (D) (A) - (III), (B) - (I), (C) - (II), (D) - (IV)
- (43) The diagram shows stress v/s strain curve for the materials A and B. From the curves we infer that



(A) A is brittle but B is ductile

(B) A is ductile and B is brittle

(C) Both A and B are ductile

(D) Both A and B are brittle

(44) Magnetic flux (in weber) in a closed circuit of resistance $20\ \Omega$ varies with time $t(s)$ as $\phi = 8t^2 - 9t + 5$. The magnitude of the induced current at $t = 0.25\ s$ will be ...mA

(A) 249

(B) 248

(C) 247

(D) 250

(45) A $12\ V$ battery connected to a coil of resistance $6\ \Omega$ through a switch, drives a constant current in the circuit. The switch is opened in $1\ ms$. The emf induced across the coil is $20\ V$. The inductance of the coil is mH

(A) 5

(B) 12

(C) 8

(D) 10

(46) The magnetic flux ϕ (in weber) linked with a closed circuit of resistance $8\ \Omega$ varies with time (in seconds) as $\phi = 5t^2 - 36t + 1$. The induced current in the circuit at $t = 2\ s$ is ____ A.

(A) 3

(B) 5

(C) 2

(D) 4

(47) A rod of length $60\ cm$ rotates with a uniform angular velocity $20\ rad\ s^{-1}$ about its perpendicular bisector, in a uniform magnetic field $0.5\ T$. The direction of magnetic field is parallel to the axis of rotation. The potential difference between the two ends of the rod is ____ V.

(A) 1

(B) 3

(C) 0

(D) 4

(48) The current in an inductor is given by $I = (3t + 8)$ where t is in second. The magnitude of induced emf produced in the inductor is $12\ mV$. The selfinductance of the inductor ____ mH.

(A) 3

(B) 4

(C) 6

(D) 7

(49) In a coil, the current changes from $-2\ A$ to $+2\ A$ in $0.2\ s$ and induces an emf of $0.1\ V$. The selfinductance of the coil is :

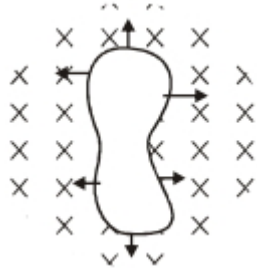
(A) $5\ mH$

(B) $1\ mH$

(C) $2.5\ mH$

(D) $4\ mH$

(50) A loop of irregular shape of conducting wire $PQRS$ (as shown in figure) placed in a uniform magnetic field perpendicular to the plane of the paper changes into a circular shape. The direction of induced current will be



(A) Clockwise

(B) Anti-clockwise

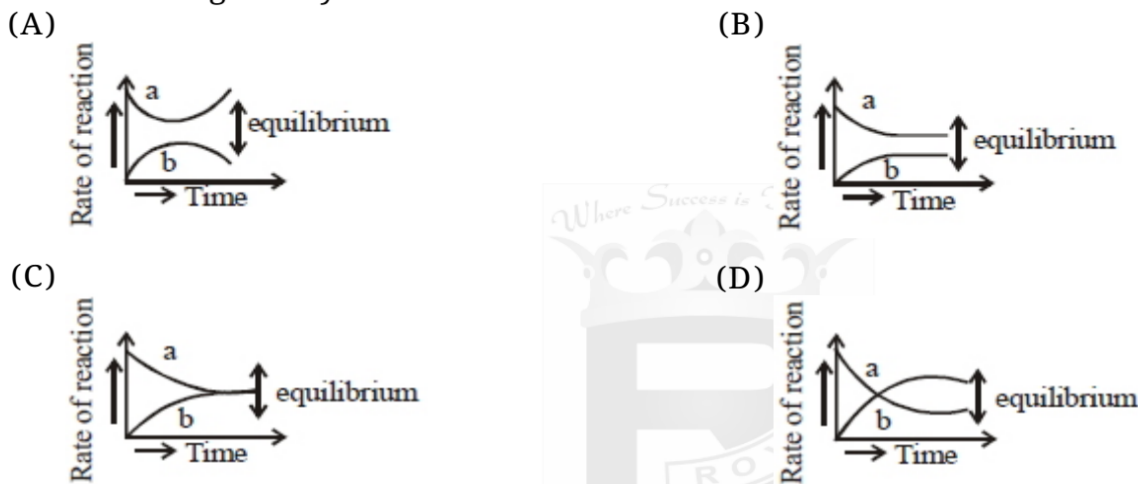
(C) No current

(D) None of these

(51) A chemical reaction is at equilibrium when

- (A) Reactants are completely transformed into products
 (B) The rates of forward and backward reactions are equal
 (C) Formation of products is minimised
 (D) Equal amounts of reactants and products are present

(52) For the equilibrium $A \rightleftharpoons B$, the variation of the rate of the forward (a) and reverse (b) reaction with time is given by



(53) The decomposition of N_2O_4 to NO_2 is carried out at 280 K in chloroform. When equilibrium has been established, 0.2 mol of N_2O_4 and 2×10^{-3} mol of NO_2 are present in 2 litre solution. The equilibrium constant for reaction $N_2O_4 \rightleftharpoons 2NO_2$ is

- (A) 1×10^{-2} (B) 2×10^{-3} (C) 1×10^{-5} (D) 2×10^{-5}

(54) In a chemical equilibrium $A + B \rightleftharpoons C + D$, when one mole each of the two reactants are mixed, 0.6 mole each of the products are formed. The equilibrium constant calculated is

- (A) 1 (B) 0.36 (C) 2.25 (D) 4/9

(55) $A(g) \rightleftharpoons B(g) + \frac{c}{2}(g)$ The correct relationship between K_P , α and equilibrium pressure P is

- (A) $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{1/2}}$ (B) $K_P = \frac{\alpha^{3/2} P^{1/2}}{(2+\alpha)^{1/2}(1-\alpha)}$ (C) $K_P = \frac{\alpha^{1/2} P^{3/2}}{(2+\alpha)^{3/2}}$ (D) $K_P = \frac{\alpha^{1/2} P^{1/2}}{(2+\alpha)^{3/2}}$

(56) A mixture of 1 mole of H_2O and 1 mole of CO is taken in a 10 litre container and heated to 725 K. At equilibrium 40% of water by mass reacts with carbon monoxide according to the equation : $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ The equilibrium constant $K_C \times 10^2$ for the reaction is (Nearest integer)

- (A) 41 (B) 42 (C) 43 (D) 44

(57) For the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$, $K_p = 0.492$ atm at 300 K. K_c for the reaction at same temperature is _____ $\times 10^{-2}$. (Given : $R = 0.082$ L atm mol⁻¹ K⁻¹)

- (A) 1 (B) 4 (C) 3 (D) 2

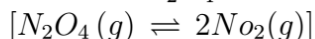
(58) In which one of the following equilibria, $K_p \neq K_c$?

- (A) $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$ (B) $2C(s) + O_2(g) \rightleftharpoons 2CO(g)$
 (C) $NO_2(g) + SO_2(g) \rightleftharpoons NO(g) + SO_3(g)$ (D) $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$

(59) For a certain reaction at 300 K, $K = 10$, then ΔG° for the same reaction is _____ $\times 10^{-1}$ kJ mol⁻¹. (Given $R = 8.314$ JK⁻¹ mol⁻¹)

- (A) 70 (B) 60 (C) 80 (D) 57

(60) Gaseous N_2O_4 dissociates into gaseous NO_2 according to the reaction



At 300 K and 1 atm pressure, the degree of dissociation of N_2O_4 is 0.2. If one mole of N_2O_4 gas is contained in a vessel, then the density of the equilibrium mixture is.....g/L

- (A) 1.56 (B) 6.22 (C) 3.11 (D) 4.56

(61) The value of K_P for the equilibrium reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ is 2. The percentage dissociation of $N_2O_4(g)$ at a pressure of 0.5 atm is

- (A) 25 (B) 88 (C) 50 (D) 71

(62) Following gaseous reaction is undergoing in a vessel $C_2H_4 + H_2 \rightleftharpoons C_2H_6$; $\Delta H = -32.7 \text{ Kcal}$
Which will increase the equilibrium concentration of C_2H_6

- (A) Increase of temperature (B) By reducing temperature
(C) By removing some hydrogen (D) By adding some C_2H_6

(63) Consider the following equation:



The number of factors which will increase the yield of SO_3 at equilibrium from the following is

- A. Increasing temperature C. Adding more SO_2
B. Increasing pressure D. Adding more O_2
E. Addition of catalyst

- (A) 2 (B) 6 (C) 5 (D) 3

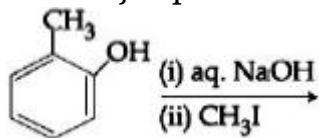
(64) In the Victor-Meyer's test, the colour given by 1° , 2° and 3° alcohols are respectively

- (A) Red, colourless, blue (B) Red, blue, colourless (C) Colourless, red, blue (D) Red, blue, violet

(65) Rate of dehydration of alcohols follows the order

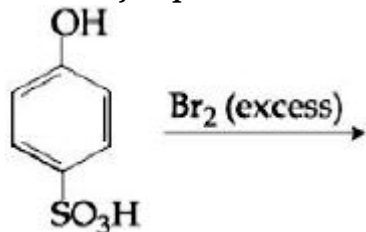
- (A) $2^\circ > 1^\circ > CH_3OH > 3^\circ$ (B) $3^\circ > 2^\circ > 1^\circ > CH_3OH$ (C) $2^\circ > 3^\circ > 1^\circ > CH_3OH$ (D) $CH_3OH > 1^\circ > 2^\circ > 3^\circ$

(66) The major product of the following reaction is



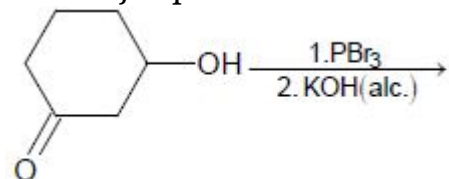
- (A) (B) (C) (D)

(67) The major product of the following reactions is



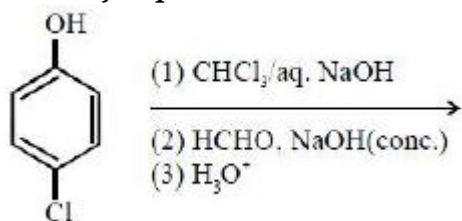
- (A) (B) (C) (D)

(68) The major product of the following reaction is

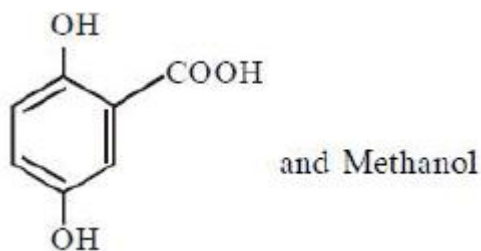


- (A) (B) (C) (D)

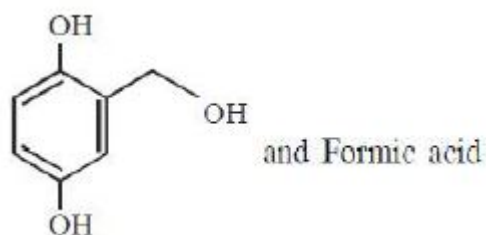
(69) The major products of the following reaction are



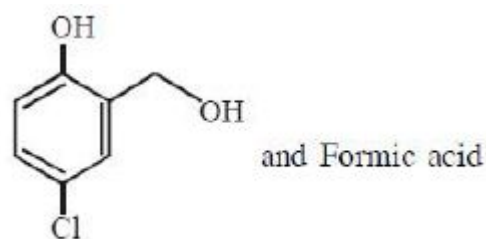
(A)



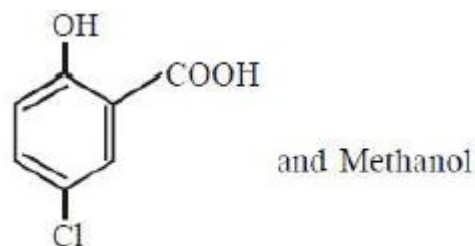
(B)



(C)



(D)



(70) When ethanol is heated with conc. H_2SO_4 , a gas is produced. The compound formed, when this gas is treated with cold dilute aqueous solution of Baeyer's reagent, is.

- (A) Formaldehyde (B) Formic acid (C) Glycol (D) Ethanoic acid

(71) Match List I With List II

| □□□□ I (□□□□□) | □□□□ II (Pk_a □□□) |
|--------------------------|-----------------------|
| A. ethanol | I. 10.0 |
| B. phenol | II. 15.9 |
| C. <i>m</i> -nitrophenol | III. 7.1 |
| D. <i>p</i> -nitrophenol | IV. 8.3 |

Choose the correct answer from the options given below:

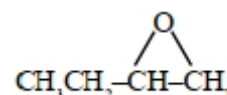
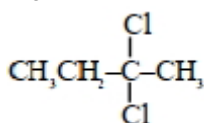
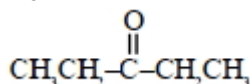
- (A) A – I, B – II, C – III, D – IV (B) A – IV, B – I, C – II, D – III
 (C) A – III, B – IV, C – I, D – II (D) A – II, B – I, C – IV, D – III

(72) In $\text{S}_{\text{N}}2$ reactions, the correct order of reactivity for the following compounds :

- (A) $\text{CH}_3\text{Cl} > (\text{CH}_3)_2\text{CHCl} > \text{CH}_3\text{CH}_2\text{Cl} > (\text{CH}_3)_3\text{CCl}$ (B) $\text{CH}_3\text{Cl} > \text{CH}_3\text{CH}_2\text{Cl} > (\text{CH}_3)_2\text{CHCl} > (\text{CH}_3)_3\text{CCl}$
 (C) $\text{CH}_3\text{CH}_2\text{Cl} > \text{CH}_3\text{Cl} > (\text{CH}_3)_2\text{CHCl} > (\text{CH}_3)_3\text{CCl}$ (D) $(\text{CH}_3)_2\text{CHCl} > \text{CH}_3\text{CH}_2\text{Cl} > \text{CH}_3\text{Cl} > (\text{CH}_3)_3\text{CCl}$

(73) Which of the following compound can give positive iodoform test when treated with aqueous KOH solution followed by potassium hypoiodite.

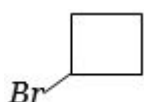
- (A) null (B) null (C) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$



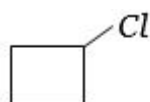
(D) null

(74) What would be the product formed when 1 – Bromo – 3– chloro cyclobutane reacts with two equivalents of metallic sodium in ether

(A)



(B)



(C)

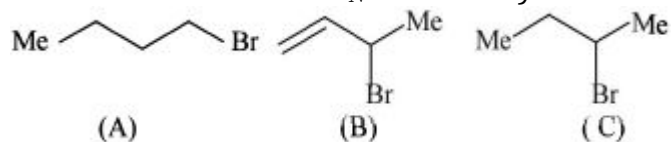


(D)



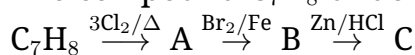
(75) Consider the following bromides :

The correct order of S_N1 reactivity is



- (A) $B > C > A$ (B) $B > A > C$ (C) $C > B > A$ (D) $A > B > C$

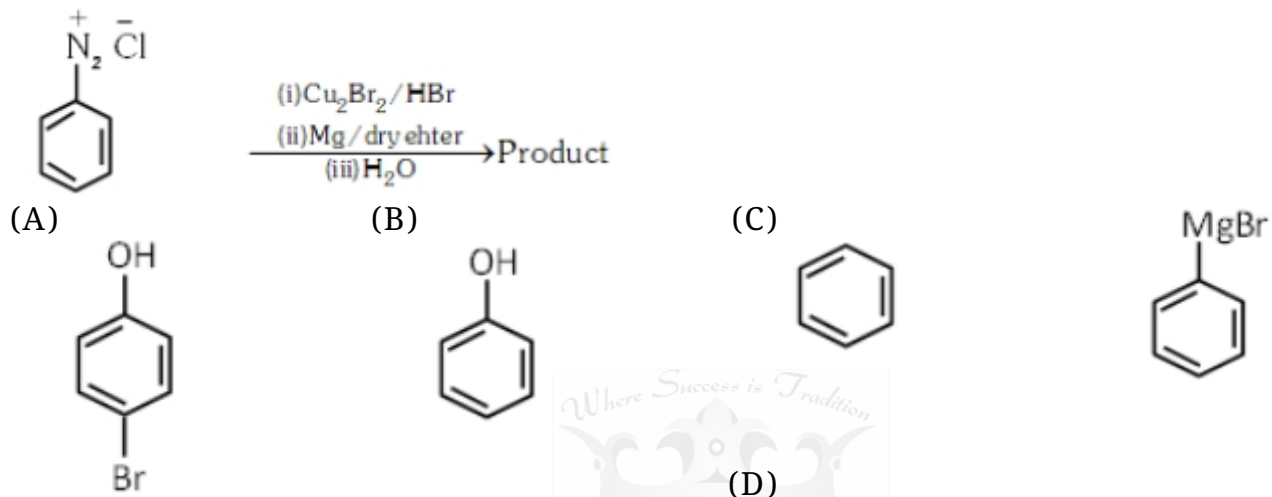
(76) The compound C_7H_8 undergoes the following reactions:



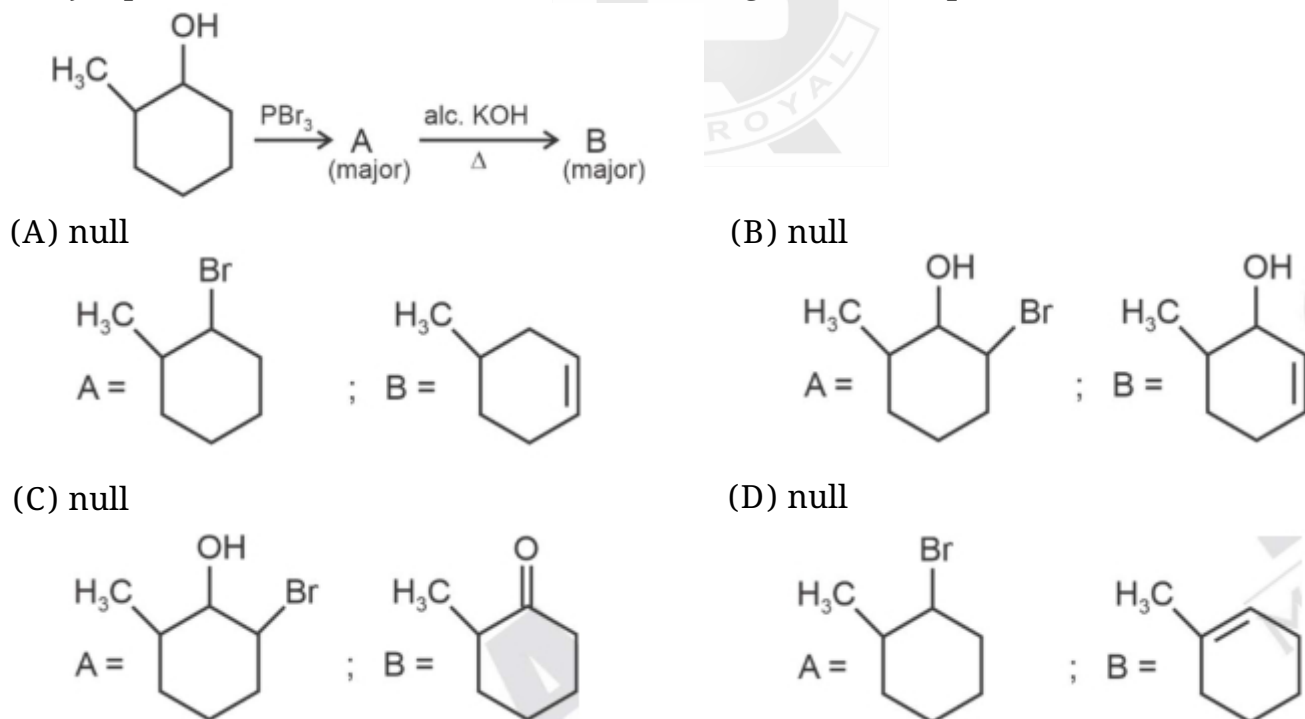
The product 'C' is

- (A) *m*-bromotoluene (B) *o*-bromotoluene
 (C) 3-bromo-2,4,6-trichlorotoluene (D) *p*-bromotoluene

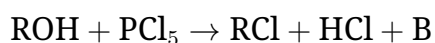
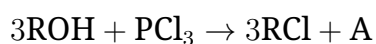
(77) Identify the product in the following reaction :



(78) Major products A and B formed in the following reaction sequence, are



(79) The products A and B obtained in the following reactions, respectively, are



- (A) $POCl_3$ and H_3PO_4 (B) H_3PO_4 and $POCl_3$ (C) H_3PO_3 and $POCl_3$ (D) $POCl_3$ and H_3PO_3

(80) The reagents with which glucose does not react to give the corresponding tests/products are

- A. Tollen's reagent B. Schiff's reagent C. HCN D. NH_2OH E. $NaHSO_3$

Choose the correct options from the given below:

- (A) A and D (B) B and E (C) E and D (D) B and C

(81) The RBC deficiency is deficiency disease of :

- (A) Vitamin B₁₂ (B) Vitamin B₆ (C) Vitamin B₁ (D) Vitamin B₂

(82) Among the following, the incorrect statement is

- (A) Cellulose and amylose have 1,4- glycosidic linkage
 (B) Lactose contains $\beta - D -$ galactose and $\beta - D -$ glucose
 (C) Maltose and lactose have 1,4- glycosidic linkage
 (D) Sucrose and amylose have 1,2- glycosidic linkage

(83) Match List-I with List-II

| | List-I | | List-II |
|-----|---------|-------|---|
| (a) | Sucrose | (i) | β -D-Galactose and β -D-Glucose |
| (b) | Lactose | (ii) | α -D-Glucose and β -D-Fructose |
| (c) | Maltose | (iii) | α -D-Glucose and α -D-Glucose |

Choose the correct answer from the options given below:

- (A) (a) \rightarrow (i), (b) \rightarrow (iii), (c) \rightarrow (ii) (B) (a) \rightarrow (iii), (b) \rightarrow (i), (c) \rightarrow (iii)
 (C) (a) \rightarrow (ii), (b) \rightarrow (i), (c) \rightarrow (iii) (D) (a) \rightarrow (iii), (b) \rightarrow (ii), (c) \rightarrow (i)

(84) Match List I with List II.

| List I | List II |
|--------------|-----------------------------|
| A. Invertase | I. Starch into maltose |
| B. Zymase | II. Maltose into glucose |
| C. Diastase | III. Glucose into ethanol |
| D. Maltase | IV. Cane sugar into glucose |

Choose the most appropriate answer from the options given below

- (A) A - III, B - IV, C - II, D - I (B) A - III, B - II, C - I, D - IV
 (C) A - IV, B - I, C - II, D - I (D) A - IV, B - II, C - III, D - I

(85) Which one of the following is a water soluble vitamin, that is not excreted easily?

- (A) Vitamin B₂ (B) Vitamin B₁ (C) Vitamin B₆ (D) Vitamin B₁₂

Chemistry - Section B (MCQ)

(86) Match List - I with List - II

| List - I | List - II |
|-------------------------------------|--------------------------|
| (A) Glucose + HI | (I) Gluconic acid |
| (B) Glucose + Br ₂ water | (II) Glucose pentacetate |
| (C) Glucose + acetic anhydride | (III) Saccharic acid |
| (D) Glucose + HNO ₃ | (IV) Hexane |

Choose the correct answer from the options given below.

- (A) (A) - (IV), (B) - (I), (C) - (II), (D) - (III) (B) (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
 (C) (A) - (III), (B) - (I), (C) - (IV), (D) - (II) (D) (A) - (I), (B) - (III), (C) - (IV), (D) - (II)

(87) The structure of protein that is unaffected by heating is

- (A) secondary structure (B) tertiary structure (C) primary structure (D) quaternary structure

(88) Identify the incorrect statement from the following :

- (A) Glycogen is called as animal starch (B) β -Glycosidic linkage makes cellulose polymer
 (C) Amylose is a branched chain polymer of glucose (D) Starch is a polymer of $\alpha - D$ glucose

(89) Compound 'A' reacts with PCl_5 to give 'B' which on treatment with KCN followed by hydrolysis gave propanoic acid as the product. What is 'A'

- (A) Ethane (B) Propane (C) Ethyl chloride (D) Ethyl alcohol

(90) Match the compounds given in List I with their characteristic reactions given in List II. Select the correct option.

| List I (Compounds) | List II (Reactions) |
|-----------------------|--|
| A. $CH_3(CH_2)_3NH_2$ | (i) Alkaline hydrolysis |
| B. $CH_3C \equiv CH$ | (ii) With KOH (alcohol) and $CHCl_3$ produces bad smell |
| C. $CH_3CH_2COOCH_3$ | (iii) Gives white ppt. with ammoniacal $AgNO_3$ |
| D. $CH_3CH(OH)CH_3$ | (iv) With Lucas reagent cloudiness appears after 5 minutes |

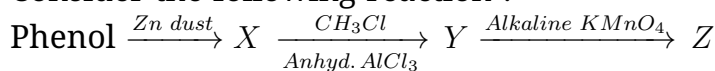
(A) A - (ii), B - (i), C - (iv), D - (iii) (B) A - (iii), B - (ii), C - (i), D - (iv)

(C) A - (ii), B - (iii), C - (i), D - (iv) (D) A - (iv), B - (ii), C - (iii), D - (i)

(91) $HOCH_2 \cdot CH_2OH$ on heating with periodic acid gives

- (A) $2HCOOH$ (B) $CHO - CHO$ (C) $2 \begin{matrix} H \\ \backslash \\ C = O \\ / \\ H \end{matrix}$ (D) $2CO_2$

(92) Consider the following reaction :



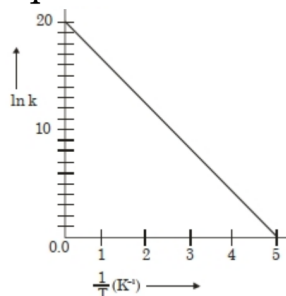
the product Z is

- (A) benzaldehyde (B) benzoic acid (C) benzene (D) toluene

(93) Ethylene oxide when treated with Grignard reagent yields

- (A) primary alcohol (B) secondary alcohol (C) tertiary alcohol (D) cyclopropyl alcohol.

(94) For a reaction, given below is the graph of $\ln k$ vs $\frac{1}{T}$. The activation energy for the reaction is equal to cal mol^{-1} . (Nearest integer). (Given : $R = 2 \text{ cal K}^{-1} \text{ mol}^{-1}$)



- (A) 8 (B) 5
(C) 4 (D) 3

(95) The activation energy of one of the reactions in a biochemical process is $532611 \text{ J mol}^{-1}$. When the temperature falls from 310 K to 300 K , the change in rate constant observed is

$k_{300} = x \times 10^{-3} k_{310}$. The value of x is [Given: $\ln 10 = 2.3$ $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$]

- (A) 1 (B) 10 (C) 45 (D) 985

(96) The rate constant of a reaction increases by five times on increase in temperature from 27°C to 52°C . The value of activation energy in kJ mol^{-1} is (Rounded-off to the nearest integer)

[$R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$]

- (A) 26 (B) 10 (C) 52 (D) 48

(97) An exothermic reaction $X \rightarrow Y$ has an activation energy 30 kJ mol^{-1} . If energy change ΔE during the reaction is -20 kJ , then the activation energy for the reverse reaction in kJ is (Integer answer)

- (A) 40 (B) 250 (C) 50 (D) 150

(98) At what temperature rate becomes double than at 300 K ? Given $\ln k = 10 - \frac{69(KJ)}{RT}$

- (A) 329 (B) 307.7 (C) 292.03 (D) 323.5

(99) What is the activation energy (KJ/mol) for a reaction if its rate constant doubles when the temperature is raised from 300 K to 400 K ? ($R = 8.314 \text{ J mol}^{-1} \text{ K}^{-1}$)

- (A) 68.8 (B) 3.44 (C) 34.4 (D) 6.88

100) The activation energy for a simple chemical reaction $A \rightarrow B$ is E_a in forward direction. The activation energy for reverse reaction

- (A) Is always double of E_a (B) Is negative of E_a
(C) Is always less than E_a (D) Can be less than or more than E_a

Biology - Section A (MCQ)

- (101) Choose the correct statement.
 (A) All mammals are viviparous. (B) All cyclostomes do not possess jaws and paired fins.
 (C) All reptiles have a threechambered heart. (D) All pisces have gills covered by an operculum.
- (102) Which group of animals belong to the same phylum?
 (A) Prawn, Scorpion, Locusta (B) Sponge, Sea anemone, Starfish
 (C) Malarial parasite, Amoeba, Mosquito (D) Earthworm, Pinworm, Tapeworm
- (103) Which one of the following groups of animals is correctly matched with its characteristic feature without any exception?
 (A) Reptilia : possess 3-chambered heart with an incompletely divided ventricle
 (B) Chordata : possess a mouth with an upper and a lower jaw
 (C) Chondrichthyes : possess cartilaginous endoskeleton
 (D) Mammalia : give birth to young ones

(104) In which one of the following the genus name, its two characters and its class/phylum are correctly matched? Genus name Two characters Class/Phylum

| | Genus name | Two characters | Class/Phylum |
|-----|------------|----------------------------------|--------------|
| (a) | Ascaris | (i) Body segmented | Annelida |
| | | (ii) Males and females distinct | |
| (b) | Salamandra | (i) A tympanum represents ear | Amphibia |
| | | (ii) Fertilization is external | |
| (c) | Pteropus | (i) Skin possesses | Mammalia |
| | | (ii) Oviparous | |
| (d) | Aurelia | (i) Cnidoblasts | Coelenterata |
| | | (ii) Organ level of organization | |

- (A) (a) and (b) (B) (b) and (c) (C) (c) and (d) (D) None of these
- (105) Which one of the following kinds of animals are triploblastic?
 (A) Flatworms (B) Sponges (C) Ctenophores (D) Corals
- (106) Which one of the following statements about certain given animals is correct?
 (A) Roundworms (Aschelminthes) are pseudo coelomates (B) Molluscs are acoelomates
 (C) Insects are pseudocoelomates (D) Flatworms (Platyhelminthes) are coelomates.
- (107) Which one of the following is a matching pair of a body feature and the animal possessing it?
 (A) Ventral central nervous system ⇒ Leech (B) Pharyngeal gill slits absent in embryo ⇒ Chamaeleon
 (C) Ventral heart ⇒ Scorpion (D) Post-anal tail ⇒ Octopus

(108) What is incorrect for Physalia ?

(A) It is diploblastic

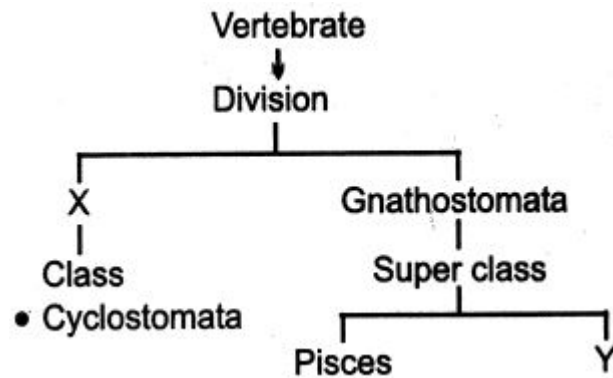
(B) It shows cellular level organization

(C) Nematocytes are present in its tentacles.

(D) Its gastro vascular cavity open by a hole is called hypostome.

(109) Select the correct option for the labeled part X and Y from the given diagram.

X - Y



(A) Agnatha - Osteichthyes

(B) Cyclostomata - Tetrapoda

(C) Agnatha - Tetrapoda

(D) Cyclostomata - Amphibia

(110) Which statement is wrong about amphibia ?

(A) They have two pairs of limbs

(B) Body is divided into head and trunk

(C) Skin is moist and eyes have eyelids

(D) Heart is two chambered (One auricle and one ventricle)

(111) Function of nematocyst in phylum cnidaria.

(A) Only for stability

(B) Defence and digest

(C) Defence the capture of prey and excretion. (D) Defence and capture of prey.

(112) Make correct pair.

| Column - I | Column - II |
|-------------------------|----------------------|
| 1. <i>Osculum</i> | p. <i>Fasciola</i> |
| 2. <i>Hypostom</i> | q. <i>Ctenoplana</i> |
| 3. <i>Combjellies</i> | r. <i>Spongilla</i> |
| 4. <i>Hookandsucker</i> | s. <i>Meandrina</i> |

(A) (1 - r), (2 - s), (3 - q), (4 - p)

(B) (1 - p), (2 - q), (3 - r), (4 - s)

(C) (1 - s), (2 - p), (3 - q), (4 - r)

(D) (1 - q), (2 - r), (3 - s), (4 - p)

(113) Asymmetrical means

(A) When any plane passing through the central axis of the body divides

(B) Any plane that passes through the center does not divide them into equal halves

(C) Where the body can be divided into identical left and right halves in only one plane

(D) None of these

(114) Choose correct sentence for Amphibia.

(A) Fertilization is external and development is indirect. (B) They are oviparous or viviparous.

(C) The animal dies after breeding.

(D) The skin is scaly.

(115) The unique mammalian characteristics are:

(A) pinna, monocondylic skull and mammary glands (B) hairs, tympanic membrane and mammary glands

(C) hairs, pinna and mammary glands

(D) hairs, pinna and indirect development

(116) Ctenoplana belongs to a group of animals which are best described as

(A) Unicellular with tissue level of organisation (B) Multicellular with radially symmetrical body

(C) Multicellular with organ level of organisation (D) Unicellular with bilaterally symmetrical bodies

(117) Which one of the following is not a characteristic feature of all the chordates?

- (A) Presence of coelom (B) A diaphragm separating thorax from abdomen
(C) Dorsal nerve cord (D) Pharyngeal gill slits in the early embryonic stages

(118) Teeth in chondrichthyes are modified

- (A) Placoid scales (B) Cycloid scales (C) Ctenoid scales (D) Rhomboid scales

(119) Which of the following is true for all amphibians?

- (A) All have tail
(B) Excretion by kidneys
(C) Alimentary canal and urinary and reproductive tracts open into different chambers to the exterior
(D) Heart is three-chambered with two ventricles

(120) Read the following statements.

- (a) Metagenesis is observed in Helminths.
(b) Echinoderms are triploblastic and coelomate animals.
(c) Round worms have organ-system level of body organization.
(d) Comb plates present in ctenophores help in digestion.
(e) Water vascular system is characteristic of Echinoderms.

Choose the correct answer from the options given below.

- (A) (c), (d) and (e) are correct (B) (a), (b) and (c) are correct
(C) (a), (d) and (e) are correct (D) (b), (c) and (e) are correct

(121) Read the following statement and choose the correct characteristic feature of Aves

- (A) Skin of birds have glands (B) Air sacs help in excretion
(C) Heart is having three auricle and one ventricle (D) Preen gland is present at the base of tail

(122) Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): All vertebrates are chordates but all chordates are not vertebrates.

Reason (R): Notochord is replaced by vertebral column in the adult vertebrates.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (A) Both (A) and (R) are correct and (R) is the correct explanation of (A)
(B) (A) is correct but (R) is not correct
(C) (A) is not correct but (R) is correct
(D) Both (A) and (R) are correct but (R) is not the correct explanation of (A)

(123) Select the correct statement w.r.t. Mango and coconut

- (A) They develop from monocarpellary superior ovaries (B) They develop from monocarpellary inferior ovaries
(C) They have fibrous epicarp (D) They have fleshy edible mesocarp

(124) The inner layer of the seed coat is called

- (A) Testa (B) Hilum (C) Micropyle (D) Tegmen

(125) Which is not a modification of stem?

- (A) Tuber of potato (B) Pitcher of Nepenthes (C) Corm of Colocasia (D) Rhizome of ginger

- (126) Thorns, spines and prickles work as ____ in plants.
 (A) Respiratory organs (B) Excretory organs (C) Organs of offense (D) Defensive organs
- (127) Scutellum is a
 (A) Food storing haploid structure in grass embryo (B) Remnant of cotyledon in maize
 (C) Shield shaped and large cotyledon of grasses (D) Protective covering of plumule in grasses
- (128) The flowers are Zygomorphic in
 (a) Mustard (b) Gulmohar (c) Cassia (d) Datura (e) Chilly
 Choose the correct answer from the options given below:
 (A) (b), (c) Only (B) (d), (e) Only (C) (c), (d), (e) Only (D) (a), (b), (c) Only
- (129) Identify the correct set of statements :
 (a) The leaflets are modified into pointed hard thorns in Citrus and Bougainvillea
 (b) Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin
 (c) Stem is flattened and fleshy in Opuntia and modified to perform the function of leaves
 (d) Rhizophora shows vertically upward growing roots that help to get oxygen for respiration
 (e) Subaerially growing stems in grasses and strawberry help in vegetative propagation
 Choose the correct answer from the options given below:
 (A) (a) and (d) Only (B) (b), (c), (d) and (e) Only (C) (a), (b), (d) and (e) Only (D) (b) and (c) Only
- (130) Given below are two statements: One is labelled as Assertion *A* and the other is labelled as Reason *R*:
 Assertion *A*: A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.
 Reason *R*: Internode of the shoot gets condensed to produce different floral appendages laterally at successive node instead of leaves.
 In the light of the above statements, choose the correct answer from the options given below :
 (A) *A* is false but *R* is true
 (B) Both *A* and *R* are true and *R* is the correct explanation of *A*
 (C) Both *A* and *R* are true but *R* is NOT the correct explanation of *A*
 (D) *A* is true but *R* is false
- (131) *A*-Leaves originate from lateral meristem and arranged in an acropetal order
R- They are the most important vegetative organ for photosynthesis
 (A) *A* and *R* both correct (B) *A* and *R* both incorrect (C) *A* correct and *R* incorrect (D) *A* incorrect and *R* correct
- (132) In which of the following plants, stem perform the function of storage and act as organ of perennation
 (A) Sweet potato (B) Asparagus (C) Ginger (D) Garlic
- (133) Epigynous flowers means
 (A) Thalamus grow upwards (B) Enclosing the ovary completely
 (C) Other parts of flower arise above the ovary (D) All of the above
- (134) *A*- Fruit is a mature or ripened ovary, developed after fertilization
R- If a fruit is formed without fertilization of the ovary, it is called a parthenocarpic fruit
 (A) *A* and *R* both correct (B) *A* and *R* both incorrect
 (C) *A* correct and *R* incorrect (D) *A* incorrect and *R* correct
- (135) Identify the given figure :



- (A) Root modified into tendrils
(C) Leaf modified into tendrils

- (B) Stem modified into tendrils
(D) None of the above

(136) Ray florets have

- (A) Half inferior ovary (B) Inferior ovary (C) Superior ovary (D) Hypogynous ovary

(137) In wheat plant _____ root system is present.

- (A) Nodulated (B) Tap (C) Fibrous (D) Prop

(138) Mark the incorrect statement

- (A) Flower is a modified shoot
(B) In cymose inflorescence, the main axis terminates in a flower
(C) Flowers are borne on successive internodes on the stems and roots
(D) When a shoot tip transforms into a flower, the flower is always solitary

(139) Basal placentation is found in

- (A) Dianthus and primrose (B) Mustard and argemone
(C) Marigold and sunflower (D) Tomatoes and lemon

(140) Identify false for dicot seed.

- (A) Possess two cotyledons (B) Food storage in cotyledons
(C) Absence of embryonic axis (D) Possess seed coat

(141) In flowers are arranged in basipetal

- (A) Cymose inflorescence (B) Racemose inflorescence
(C) A and B correct (D) A and B incorrect

(142) If theX.... of the lamina reach up to the ... Y...breaking it into a number ofZ..... the leaf is called compound leaf.

- (A) X- incisions, Y - midrib, Z - leaflets (B) X- midrib, Y - leaflets, Z - incisions
(C) X-leaf, Y - midrib, Z- incisions (D) X - incisions, Y - midrib, Z - leaf

(143) Delete odd one:

- (A) Potato : (B) Zinger (C) Turmeric (D) Asparagus

(144) Given below are two statements:

Statement I: Parenchyma is living but collenchyma is dead tissue.

Statement II : Gymnosperms lack xylem vessels but presence of xylem vessels is the characteristic of angiosperms.

In the light of the above statements, choose the correct answer from the options given below:

- (A) Both Statement I and Statement II are false (B) Statement I is true but Statement II is false
(C) Statement I is false but Statement II is true (D) Both Statement I and Statement II are true

(145) In which of the following characters, a monocot root differs from a dicot root?

- (A) Radial vascular bundles (B) Large pith
(C) Conjunctive tissue in between xylem and phloem (D) Single layered endodermis

(146) Match the following

| Column-I | Column-II |
|--|-----------------------|
| (a). Hypodermis in dicot stem | (i) Absent |
| (b). Pericycle in dicot stem | (ii) Parenchymatous |
| (c). Ground tissue in monocot stem | (iii) Collenchymatous |
| (d). Phloem parenchyma in monocot stem | (iv) Sclerenchymatous |

(A) *a(iv), b(i), c(iii), d(ii)* (B) *a(i), b(ii), c(iv), d(iii)* (C) *a(iii), b(iv), c(ii), d(i)* (D) *a(ii), b(iii), c(i), d(iv)*

- (147) Which of the following is not true for the vascular bundles of monocotyledonous stems?
 (A) Scattered in the ground tissue (B) Possess water-containing cavities
 (C) 'Ring' arrangement (D) Conjoint and closed
- (148) The epidermis in a dorsiventral leaf (a) Covers both adaxial and abaxial surfaces (b) Is not covered by cuticle (c) Bears more stomata on the upper side (d) May even lack stomata on the upper side Which of the above statements are correct?
 (A) *a and c* (B) *b and d* (C) *a and d* (D) *b and c*
- (149) Choose correct option w.r.t. spongy mesophyll in dicot leaf.
 (A) Numerous large spaces and air cavities (B) A large number of chloroplasts between its cells
 (C) Present on the adaxial surface (D) Vertical and parallel arrangement of cells
- (150) The size of vascular bundles in a dorsiventral leaf is dependent on
 (A) Size of lamina (B) Size of veins (C) Number of stomata (D) Number of veins
- (151) During water stress, the bulliform cells (a) Become turgid (b) Become flaccid (c) Make the leaves curl inwards (d) Make the leaf surface exposed The correct options are
 (A) *a and c* (B) *b and d* (C) *a and d* (D) *b and c*
- (152) Casparian bands (strips) are characteristic feature of:
 (A) Endodermis (B) Epiblema (C) Exodermis (D) Epidermis
- (153) Assertion: In dicotyledonous stems open vascular bundles present.
 Reason: Cambium is present between phloem and it possess the ability to form secondary xylem and phloem tissues.
 (A) Both (A) and (R) are correct and (R) is the correct explanation of (A) (B) (A) is correct but (R) is not correct
 (C) (A) is not correct but (R) is correct (D) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (154) Meristem is characterized by
 (A) Isodiametric cells with cellulose thin wall (B) Absence of intercellular space and vacuole
 (C) Absence of reserve food material and plastids (D) All of these
- (155) Find set of cells connected by pit fields between their common longitudinal walls
 (A) Companion cell and phloem fibres (B) Companion cell and sieve tube
 (C) Sieve cell and albuminous cell (D) Sieve tube and phloem fibre
- (156) Select correct features w.r.t. trichomes in shoot system (a) Usually unicelled (b) Branched or unbranched (c) May be secretory (d) Soft or stiff (e) Helps against transpiration
 (A) *a, b, d and e* (B) *All except 'c' and 'd'*
 (C) *All except 'a'* (D) *a, c and e*
- (157) Pericycle of the roots is never sclerenchymatous because it
 (A) Does not act as a mechanical tissue in roots (B) Is the place of origin of root branches
 (C) Gives rise to root hairs (D) Gives rise to root hairs (when the root is young), and to root branches (at maturity)
- (158) The vascular bundles in the stems of most of dicots are conjoint, collateral and open. In each of these bundles

- (A) Xylem and phloem are on the same radius with phloem towards the pith and xylem towards the pericycle without a strip of cambium between them
- (B) Xylem and phloem are on the same radius with xylem situated towards the pith and phloem situated towards the pericycle and a strip of cambium separates the two
- (C) Xylem completely surrounds the phloem on all sides but the two are separated by the cambium
- (D) Phloem completely surrounds the xylem and a strip of cambium separates the two

(159) Vascular cambium is a meristematic layer that cuts off

- (A) Primary xylem and primary phloem (B) Xylem vessels and xylem tracheids
- (C) Primary xylem and secondary xylem (D) Secondary xylem, secondary phloem and medullary rays

(160) When secondary growth is initiated in dicot stem, what will happen first?

- (A) The cells of cambium divide periclinally to form xylem mother cells (B) Interfascicular cambium join with intrafascicular cambium
- (C) Parenchymatous cells present between vascular bundles become meristematic (D) Pith get obliterated

(161) Select the correct pair.

- (A) Large colorless empty cells in the epidermis of grass leaves – Subsidiary cells
- (B) In dicot leaves, vascular bundles are surrounded by large thick-walled cells – Conjunctive tissue
- (C) Cells of medullary rays that form part of cambial ring – Interfascicular cambium
- (D) Loose parenchyma cells rupturing the epidermis and forming a lensshaped opening in bark – Spongy parenchyma

(162) Which of the following in sewage treatment removes suspended solids?

- (A) Secondary treatment (B) Primary treatment (C) Sludge treatment (D) Tertiary treatment

(163) Which of the following is correctly matched for the product produced by them?

- (A) Methanobacterium : Lactic acid (B) Penicillium notatum : Acetic acid
- (C) Sacchromyces cerevisiae : Ethanol (D) Acetobacter aceti : Antibiotics

(164) Match column I with column II and select the correct option using the codes given below.

| Column –I | Column –II |
|-------------------|-------------------|
| (A) Citric acid | (i) Trichoderma |
| (B) Cyclosporin A | (ii) Clostridium |
| (C) Statins | (iii) Aspergillus |
| (D) Butyric acid | (iv) Monascus |

- (A) A – (iii), B – (i), C – (ii), D – (iv) (B) A – (iii), B – (i), C – (iv), D – (ii)
- (C) A – (i), B – (iv), C – (ii), D – (iii) (D) A – (iii), B – (iv), C – (i), D – (ii)

(165) Match the following list of microbes and their importance.

| Column –I | Column –II |
|------------------------------|--|
| (A) Saccharomyces cerevisiae | (i) Production of immuno-suppressive agent |
| (B) Monascus purpureus | (ii) Ripening of Swiss cheese |
| (C) Trichoderma polysporum | (iii) Commercial production of ethanol |
| (D) Propionibacterium | (iv) Production of blood-cholesterol lowering agents |

- (A) A – (iv), B – (ii), C – (i), D – (iii) (B) A – (iii), B – (i), C – (iv), D – (ii)
- (C) A – (iii), B – (iv), C – (i), D – (ii) (D) A – (iv), B – (iii), C – (ii), D – (i)

(166) A patient brought to a hospital with myocardial infarction is normally immediately given

(A) penicillin (B) streptokinase (C) cyclosporin-A (D) statins.

(167) Which one of the following is an example of carrying out biological control of pests/diseases using microbes?

- (A) *Trichoderma* sp. against certain plant pathogens. (B) Nucleopolyhedrovirus against white rust in Brassica.
(C) Bt cotton to increase cotton yield. (D) Lady bird beetle against aphids in mustard.

(168) Which one of the following is not a biofertiliser?

- (A) *Agrobacterium* (B) *Rhizobium* (C) *Nostoc* (D) Mycorrhiza

(169) Secondary sewage treatment is mainly a

- (A) physical process (B) mechanical process (C) chemical process (D) biological process.

(170) An organism used as a biofertilizer for raising soyabean crop is

- (A) *Azotobacter* (B) *Azospirillum* (C) *Rhizobium* (D) *Nostoc*.

(171) Organisms called methanogens are most abundant in a

- (A) sulphur rock (B) cattle yard (C) polluted stream (D) hot spring.

(172) Select the correct statement from the following.

- (A) Biogas is produced by the activity of aerobic bacteria on animal waste
(B) *Methanobacterium* is an aerobic bacterium found in rumen of cattle
(C) Biogas, commonly called gobar gas, is pure methane
(D) Activated sludge sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria.

(173) From the given below who increase vitamin B_{12} in our stomach and too play very beneficial role in checking disease causing microbes ?

- (A) Antibiotic (B) Lactic acid bacteria
(C) *Saccharomyces cerevisiae* (D) *Aspergillus niger*

(174) Choose the correct one.

- (A) Lipase - removes stains (B) Streptokinase - clear bottled juices
(C) Cyclosporin - A - clear blood clot (D) Amylase - increase cholesterol in blood

(175) Statin produced by the yeast, which have been commercialized as blood - cholesterol lowering agents ?

- (A) *Trichoderma polysporum* (B) *Monascus purpureus*
(C) *Streptococcus* (D) *Lactobacillus*

(176) It refers to the amount of oxygen that would be consumed if all the organic matter in one liter of water were oxidized by bacteria.

- (A) *DOD* (B) *BOD* (C) *COD* (D) *STP*

(177) *A* - *BOD* is a measure of the organic matter present in the water.

R - The lower the *BOD* of water, lower is its polluting potentials.

- (A) *A* and *R* both are correct. (B) *A* and *R* both are incorrect.
(C) *A* is correct, *R* is incorrect. (D) *A* is incorrect, *R* is correct.

(178) Activated sludge means.

- (A) Sedimented flocks (B) Aerobic bacteria (C) Anaerobic bacteria (D) Primary sludge

(179) *Penicillium notatum* stops the growth of

- (A) *Aspergillus niger* (B) *Trichoderma polysporum*
(C) *Monascus purpureus* (D) *Staphylococci*

(180) - They are pathogens

- They attack insects and other arthropods.

- (A) *Anabena* (B) Mycorrhiza (C) *Azospirillum* (D) Baculo virus

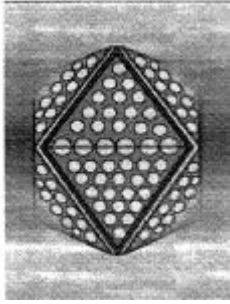
(181) It is responsible for citric acid formation

- (A) *Acetobacter aceti* (B) *Aspergillus niger* (C) *Streptococcus* (D) None

(182) It is an antibiotic

- (A) Malic acid (B) Streptokinase (C) Penicillin (D) Stetins

(183) Identify given figure and which system is affected by it ?



- (A) Adino virus, Digestive system (B) *TMV*, Respiratory
(C) Adino virus, Respiratory (D) *TMV*, Digestive system

(184) The Roquefort cheese are ripened by growing a.....on them, which gives them a particular flavour

- (A) Fungi (B) Virus (C) Bacteria (D) Algae

(185) Identify correct option for micorrhiza

- (1) Many members of the genus *glomus* involved micorrhiza
(2) It is responsible for all minerals absorption from the soil
(3) Such associations show benefits against draught and salinity in plants
(4) Micorrhiza is a symbiotic relation of algae and plants

- (A) 2, 4 (B) 2, 3 (C) 1, 4 (D) 1, 3

(186) Primary treatment is the

- (A) physical removal of large and small particles from sewage (B) biological removal of large and small particles from sewage

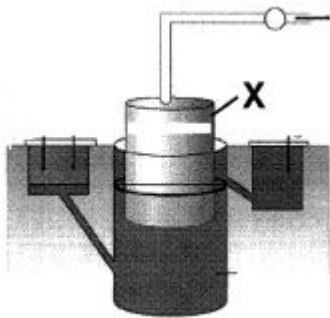
(C) Both (A) and (B)

(D) chemical removal of large and small particles from sewage

(187) Flocks are made up of.....

- (A) Bacteria and fungal filaments (B) Fungal filaments and activated sludge
(C) Bacteria and primary sludge (D) Algae and fungal filaments

(188) Which gases are produced in labelled part X in given figure ?



- (A) O_2, CO, CO_2, H_2, CH_4 (B) CO_2, O_2, H_2 (C) CH_4, H_2, CO_2, O_2 (D) CO_2, H_2, CH_4

(189) Big holes in swiss cheese are made by a

- (A) Machine
(B) Bacterium that produces methane gas ..
(C) Bacterium producing a large amount of carbon dioxide
(D) fungus that releases a lot of gases during its metabolic activities

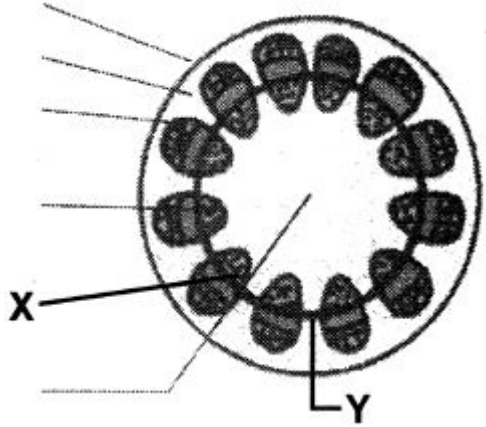
(190) Bt cotton is used to destroy

- (A) Caterpillar of butterfly (B) Cockroach alimentary canal
(C) *Aschleminthus* (D) Mosquito's intestine

(191) Genus of Baculo virus is

- (A) Retro virus (B) Nucleopolyhedro! (C) *TMV* (D) Adeno virus

(192) Identify *X* and *Y* in figure
X - Y



- (A) Primary phloem - Interfascicular cambium (B) Pith - Vascular cambium
 (C) Interfascicular cambium - primary xylem (D) Primary xylem - Interfascicular cambium

(193) Intercellular space is more in..

- (A) Collenchyma (B) Schlerenchyma (C) Parenchyma (D) All correct

(194) Match the following

| Column - I | Column - II |
|------------------|-------------------------------------|
| (a) Dicot leaf | (p) Polyarch |
| (b) Dicot stem | (q) Pallisade and spongy mesophy II |
| (c) Monocot root | (r) Endarch |
| (d) Monocot leaf | (s) Bulli form Cell |

- (A) $a - r, b - s, c - p, d - q$ (B) $a - p, b - r, c - s, d - q$
 (C) $a - s, b - q, c - p, d - r$ (D) $a - q, b - r, c - p, d - s$

(195) Ground tissue includes

- (A) all tissues external to endodermis (B) all tissues except epidermis and vascular bundle
 (C) epidemis and cortex (D) all tissues internal to endodermis

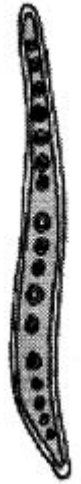
(196) Xylem tissue is composed of

- (A) four same kinds of elements (B) three same kinds of elements
 (C) four different kinds of elements (D) three different kinds of elements is

(197) The first formed primary phloem referred as...*A*... The later formed primary phloem is referred as ...*B*...

- Choose the correct combinations of *A* and *B*
 (A) *A*-protoxylem, *B*-metaxylem (B) *A*-protophloem, *B*-sieve tube cells
 (C) *A*-metaphloem, *B*-sieve tube cells (D) *A*-protophloem, *B*-metaphloem

(198) Identify figure :



(A) Bacillus bacteria (B) A tracheid (C) Mesophyll cell (D) Nerve cell

(199) Stomata in grass leaf are

(A) Barrel shaped (B) Dumb-bell shaped (C) Rectangular (D) Kidney shaped

(200) The transverse section of a plant shows following anatomical features:

(a) Large number of scattered vascular bundles surrounded by bundle sheath.

(b) Large conspicuous parenchymatous ground tissue.

(c) Vascular bundles conjoint and closed.

(d) Phloem parenchyma absent. Identify the category of plant and its part

(A) Dicotyledonous root

(B) Monocotyledonous stem

(C) Monocotyledonous root

(D) Dicotyledonous stem