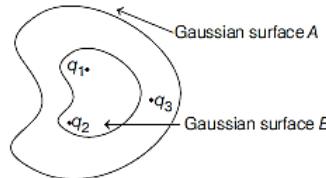


# Physics

## Srb-3 Sunday 21-12-2025

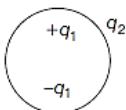
- 1 An electric dipole of moment  $p$  is placed in an electric field of intensity  $E$ . The dipole acquires a position such that the axis of the dipole makes an angle  $\theta$  with the direction of the field. Assuming that the potential energy of the dipole to be zero when  $\theta = 90^\circ$ , the torque and the potential energy of the dipole will respectively be → CBSE AIPMT 2012
- (a)  $pE \sin\theta - pE \cos\theta$       (b)  $pE \sin\theta - 2pE \cos\theta$   
 (c)  $pE \sin\theta, 2pE \cos\theta$       (d)  $pE \cos\theta, -pE \sin\theta$

- 2 The electric flux for Gaussian surface  $A$  that enclose the charged particles in free space is  
 (Given  $q_1 = -14 \text{ nC}$ ,  $q_2 = 78.85 \text{ nC}$ ,  $q_3 = -56 \text{ nC}$ )



- (a)  $10^3 \text{ Nm}^2 \text{ C}^{-1}$       (b)  $10^3 \text{ CN}^{-1} \text{ m}^{-2}$   
 (c)  $6.32 \times 10^3 \text{ Nm}^2 \text{ C}^{-1}$       (d) zero

- 3 Consider the charge configuration and a spherical Gaussian surface as shown in figure. When calculating the flux of the electric field over the spherical surface, the electric field will be due to
- (a)  $q_2$       (b) only the positive charges  
 (c) all the charges      (d)  $+q_1$  and  $-q_1$



- 4 If the electric flux entering and leaving an enclosed surface respectively is  $\phi_1$  and  $\phi_2$ , the electric charge inside the surface will be
- (a)  $(\phi_1 + \phi_2)\epsilon_0$       (b)  $(\phi_2 - \phi_1)\epsilon_0$   
 (c) zero      (d)  $\phi_2/\epsilon_0$

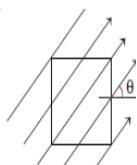
- 5 What is the total flux from the surface of cylinder of radius  $R$  and length  $L$  which is placed in a uniform electric field  $E$  parallel to cylinder axis?
- (a)  $2\pi R^2 E$       (b)  $\pi R^2 E$   
 (c)  $(\pi R + \pi R^2)/E$       (d) zero

- 6 A hemisphere surface of radius  $R$  is placed in uniform electric field of intensity  $E$  parallel to the axis of its circular plane. What will be the electric flux  $\phi$  through the hemisphere surface?
- (a)  $2\pi RE$       (b)  $2\pi R^2 E$   
 (c)  $\pi R^2 E$       (d)  $(4/3)\pi R^3 E$

- 7 What is the total electric flux leaving a spherical surface of radius 1 cm and surrounding at electric dipole?
- (a)  $q/\epsilon_0$       (b) zero      (c)  $2q/\epsilon_0$       (d)  $8\pi r^2 q/\epsilon_0$

- 8 A square surface of side  $L$  metre in the plane of the paper is placed in a uniform electric field  $E$  (V/m) acting along the same place at an angle  $\theta$  with the horizontal side of the square as shown in figure. The electric flux linked to the surface in unit of V-m, is

- (a)  $EL^2$       (b)  $EL^2 \cos\theta$       (c)  $EL^2 \sin\theta$       (d) 0

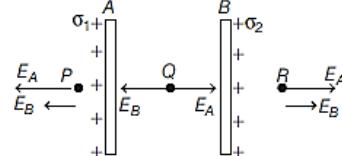


- 9 What is the flux through a cube of side  $a$  if a point charge of  $q$  is at one of its corner? → CBSE AIPMT 2012
- (a)  $\frac{2q}{\epsilon_0}$       (b)  $\frac{q}{8\epsilon_0}$   
 (c)  $\frac{q}{\epsilon_0}$       (d)  $\frac{q}{2\epsilon_0} 6a^2$

- 10 There exists an electric field of  $1 \text{ N/C}$  along  $y$ -direction. The flux passing through the square of  $1 \text{ m}$  placed in  $xy$  plane inside the electric field is
- (a)  $1 \text{ Nm}^2/\text{C}$       (b)  $10 \text{ Nm}^2/\text{C}$       (c)  $2 \text{ Nm}^2/\text{C}$       (d) zero

- 11 A hollow metallic sphere of radius  $R$  is given a charge  $Q$ . Then, the potential at the centre is → AFMC 2010
- (a) zero      (b)  $\frac{1}{4\pi\epsilon_0} \frac{Q}{R}$       (c)  $\frac{1}{4\pi\epsilon_0} \frac{2Q}{R}$       (d)  $\frac{1}{4\pi\epsilon_0} \frac{Q}{2R}$

- 12 Two identical metal plates are given positive charge  $Q_1$  and  $Q_2$  such that  $Q_2 < Q_1$ . If they are now brought close to each other to form a parallel plate capacitor of capacitance  $C$ , the potential difference between them is



- (a)  $\frac{Q_1 + Q_2}{2C}$       (b)  $\frac{Q_1 + Q_2}{C}$   
 (c)  $\frac{Q_1 - Q_2}{C}$       (d)  $\frac{Q_1 - Q_2}{2C}$

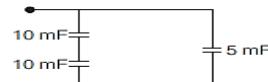
- 13 Work done in placing a charge of  $8 \times 10^{-18} \text{ C}$  on a condenser of capacity  $100 \mu\text{F}$  is
- (a)  $16 \times 10^{-32} \text{ J}$       (b)  $31 \times 10^{-26} \text{ J}$   
 (c)  $4 \times 10^{-10} \text{ J}$       (d)  $32 \times 10^{-32} \text{ J}$

- 14 Two capacitors of capacitances  $3 \mu\text{F}$  and  $6 \mu\text{F}$  are charged to a potential of  $12 \text{ V}$  each. They are now connected to each other, with the positive plate of each joined to the negative plate of the other. The potential difference across each will be
- (a)  $4 \text{ V}$       (b)  $6 \text{ V}$   
 (c) zero      (d)  $3 \text{ V}$

- 15 Three capacitors each of capacitance  $C$  and of breakdown voltage  $V$  are joined in series. The capacitance and breakdown voltage of the combination will be → CBSE AIPMT 2009
- (a)  $\frac{C}{3}, \frac{V}{3}$       (b)  $3C, \frac{V}{3}$   
 (c)  $\frac{C}{3}, 3V$       (d)  $3C, 3V$

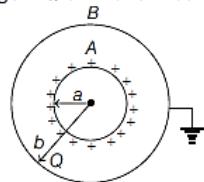
- 16 A capacitor having capacity of  $2.0 \mu\text{F}$  is charged to  $200 \text{ V}$  and then the plates of the capacitor are connected to a resistance wire. The heat produced in joule will be
- (a)  $2 \times 10^{-2}$       (b)  $4 \times 10^{-2}$   
 (c)  $4 \times 10^4$       (d)  $4 \times 10^{10}$

- 17 The equivalent capacitance of the following combination is



- (a)  $10 \mu\text{F}$       (b)  $4 \mu\text{F}$   
 (c)  $25 \mu\text{F}$       (d)  $15 \mu\text{F}$

- 18 What will be the equivalent capacitance of the system as shown in the figure, where two spherical conductors A and B of radii  $a$  and  $b$  ( $b > a$ ) are placed concentrically in air with a charge  $Q$  on A and B being earthed?



- (a)  $4\pi\epsilon_0 \left( \frac{ab}{b-a} \right)$  (b)  $4\pi\epsilon_0(a+b)$   
 (c)  $4\pi\epsilon_0 b$  (d)  $4\pi\epsilon_0 \left( \frac{b^2}{b-a} \right)$

- 19 A capacitor of capacitance  $C$  has charge  $Q$  and stored energy is  $W$ . If the charge is increased to  $2Q$ , the stored energy will be

- (a)  $\frac{W}{4}$  (b)  $\frac{W}{2}$   
 (c)  $2W$  (d)  $4W$

- 20 Two capacitors of  $10\text{ }\mu\text{F}$  and  $20\text{ }\mu\text{F}$  are connected in series with a  $30\text{ V}$  battery. The charge on the capacitors will be respectively

- (a)  $100\text{ }\mu\text{C}$ ,  $100\text{ }\mu\text{C}$  (b)  $200\text{ }\mu\text{C}$ ,  $100\text{ }\mu\text{C}$   
 (c)  $200\text{ }\mu\text{C}$ ,  $200\text{ }\mu\text{C}$  (d)  $100\text{ }\mu\text{C}$ ,  $200\text{ }\mu\text{C}$

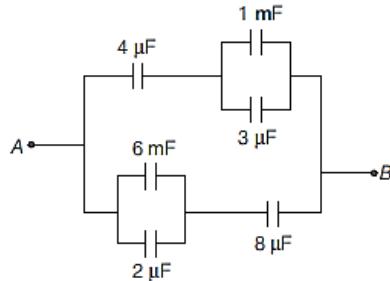
- 21 27 small drops each having charge  $q$  and radius  $r$  coalesce to form big drop. How many times charge and capacitance will become?

- (a) 3, 27 (b) 27, 3  
 (c) 27, 27 (d) 3, 3

- 22 A series combination of  $n_1$  capacitors, each of value  $C_1$ , is charged by a source of potential difference  $4V$ . When another parallel combination of  $n_2$  capacitors, each of value  $C_2$ , is charged by a source of potential difference  $V$ , it has the same (total) energy stored in it, as the first combination has. The value of  $C_2$ , in terms of  $C_1$ , is then

- CBSE AIPMT 2010  
 (a)  $\frac{2C_1}{n_1 n_2}$  (b)  $16 \frac{n_2}{n_1} C_1$  (c)  $2 \frac{n_2}{n_1} C_1$  (d)  $\frac{16C_1}{n_1 n_2}$

- 23 The equivalent capacitance between A and B for the combination of capacitors shown in figure, where all capacitances are in microfarad is



- (a)  $6.0\text{ }\mu\text{F}$  (b)  $4.0\text{ }\mu\text{F}$  (c)  $2.0\text{ }\mu\text{F}$  (d)  $3.0\text{ }\mu\text{F}$

- 24 An electric dipole is placed at an angle of  $30^\circ$  with an electric field intensity  $2 \times 10^5\text{ N/C}$ . It experiences a torque equal to  $4\text{ Nm}$ . The charge on the dipole, if the dipole length is  $2\text{ cm}$ , is

- NEET 2016  
 (a)  $8\text{ mC}$  (b)  $2\text{ mC}$  (c)  $5\text{ mC}$  (d)  $7\text{ }\mu\text{C}$

- 25 The electric field in a certain region is acting radially outward and is given by  $E = Ar$ . A charge contained in a sphere of radius ' $a$ ' centred at the origin of the field will be given by

→ CBSE AIPMT 2015

- (a)  $4\pi\epsilon_0 Aa^2$  (b)  $A\epsilon_0 a^2$   
 (c)  $4\pi\epsilon_0 Aa^3$  (d)  $\epsilon_0 Aa^3$

- 26 If potential (in volts) in a region is expressed as  $V(x, y, z) = 6xy - y + 2yz$ , the electric field (in N/C) at point  $(1, 1, 0)$  is

→ CBSE AIPMT 2015

- (a)  $-(3\hat{i} + 5\hat{j} + 3\hat{k})$  (b)  $-(6\hat{i} + 5\hat{j} + 2\hat{k})$   
 (c)  $-(2\hat{i} + 3\hat{j} + \hat{k})$  (d)  $-(6\hat{i} + 9\hat{j} + \hat{k})$

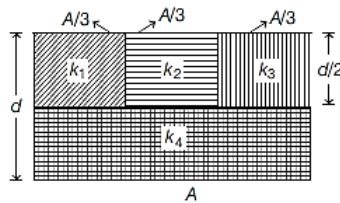
- 27 In a region, the potential is represented by  $V(x, y, z) = 6x - 8xy - 8y + 6yz$ , where  $V$  is in volts and  $x, y, z$  are in metres. The electric force experienced by a charge of  $2\text{ C}$  situated at point  $(1, 1, 1)$  is

→ CBSE AIPMT 2014

- (a)  $6\sqrt{5}\text{ N}$  (b)  $30\text{ N}$   
 (c)  $24\text{ N}$  (d)  $4\sqrt{35}\text{ N}$

- 28 A parallel-plate capacitor of area  $A$ , plate separation  $d$  and capacitance  $C$  is filled with four dielectric materials having dielectric constants  $k_1, k_2, k_3$  and  $k_4$  as shown in the figure below. If a single dielectric material is to be used to have the same capacitance  $C$  in this capacitor, then its dielectric constant  $k$  is given by

→ NEET 2016



- (a)  $k = k_1 + k_2 + k_3 + 3k_4$  (b)  $k = \frac{2}{3}(k_1 + k_2 + k_3) + 2k_4$   
 (c)  $\frac{2}{k} = \frac{3}{k_1 + k_2 + k_3} + \frac{1}{k_4}$  (d) None of these

- 29 Two bodies A (of mass  $1\text{ kg}$ ) and B (of mass  $3\text{ kg}$ ) are dropped from heights of  $16\text{ m}$  and  $25\text{ m}$ , respectively. The ratio of the time taken by them to reach the ground is

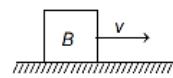
- (a)  $5/4$  (b)  $12/5$   
 (c)  $5/12$  (d)  $4/5$

- 30 A particle starting from the origin  $(0, 0)$  moves in a straight line in the XY-plane. Its coordinates at a later time are  $(\sqrt{3}, 3)$ . The path of the particle makes with the X-axis an angle of

- (a)  $30^\circ$  (b)  $45^\circ$  (c)  $60^\circ$  (d)  $0^\circ$

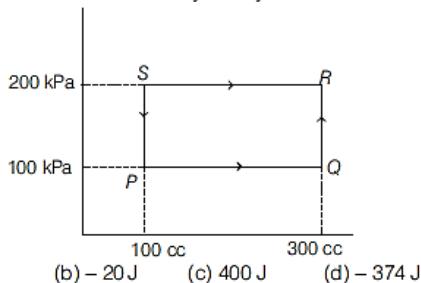
- 31 A block B is pushed momentarily along a horizontal surface with an initial velocity  $v$ . If  $\mu$  is the coefficient of sliding friction between B and the surface, block B will come to rest after a time

- (a)  $\frac{v}{g\mu}$  (b)  $\frac{g\mu}{v}$   
 (c)  $\frac{g}{v}$  (d)  $\frac{v}{g}$



- 32 A stone of mass 0.25 kg tied to the end of a string is whirled round in a circle of radius 1.5 m with speed 40 rev/min in a horizontal plane. What is the tension in the string? What is the maximum speed with which the stone can be whirled around, if the string can withstand a maximum tension of 200 N?  
 (a) 4.4 N, 32.0 m/s      (b) 6.6 N, 34.6 m/s  
 (c) 4.4 N, 42.8 m/s      (d) 6.6 N, 24.8 m/s
- 33 What is the minimum velocity with which a body of mass  $m$  must enter a vertical loop of radius  $R$  so that it can complete the loop?  
 → NEET 2016  
 (a)  $\sqrt{2gR}$       (b)  $\sqrt{3gR}$   
 (c)  $\sqrt{5gR}$       (d)  $\sqrt{gR}$
- 34 The moment of inertia of a thin uniform circular disc about one of its diameter is  $I$ . The moment of inertia about an axis perpendicular to the circular surface and passing through its centre is  
 (a)  $2I$       (b)  $I/\sqrt{2}$   
 (c)  $\sqrt{2}I$       (d)  $I/2$
- 35 In an orbital motion, the angular momentum vector is  
 (a) along the radius vector  
 (b) parallel to the linear momentum  
 (c) in the orbital plane  
 (d) perpendicular to the orbital plane
- 36 The orbital velocity of an artificial satellite in a circular orbit just above the earth's surface is  $v$ . For a satellite orbiting at an altitude of half the earth's radius the orbital velocity is  
 (a)  $\frac{3}{2}v$       (b)  $\sqrt{\frac{3}{2}}v$       (c)  $\sqrt{\frac{2}{3}}v$       (d)  $\frac{2}{3}v$
- 37 The work done in increasing the length of a wire of area of cross-section  $0.1 \text{ mm}^2$  by 1% will be ( $Y = 9 \times 10^{11} \text{ Pa}$ )  
 (a)  $2 \times 10^2 \text{ J}$       (b)  $4.5 \times 10^2 \text{ J}$       (c)  $3 \times 10^2 \text{ J}$       (d)  $6 \times 10^2 \text{ J}$
- 38 Three rods of same dimensions have thermal conductivities  $3K$ ,  $2K$  and  $K$ . They are arranged as shown, with their ends at  $100^\circ\text{C}$ ,  $50^\circ\text{C}$  and  $0^\circ\text{C}$ . The temperature of their junction is  
  
 (a)  $75^\circ\text{C}$       (b)  $\frac{200}{3}^\circ\text{C}$       (c)  $40^\circ\text{C}$       (d)  $\frac{100}{3}^\circ\text{C}$
- 39 When temperature of an ideal gas is increased from  $27^\circ\text{C}$  to  $227^\circ\text{C}$ . Its rms speed changed from  $400 \text{ m/s}$  to  $v_s$ . The  $v_s$  is  
 (a)  $516 \text{ m/s}$       (b)  $450 \text{ m/s}$       (c)  $310 \text{ m/s}$       (d)  $746 \text{ m/s}$
- 40 If the coefficient of performance of a refrigerator is 5 and it operates at the room temperature ( $27^\circ\text{C}$ ), find the temperature inside the refrigerator.  
 (a)  $-23^\circ\text{C}$       (b)  $-20^\circ\text{C}$       (c)  $-15^\circ\text{C}$       (d)  $-31^\circ\text{C}$
- 41 A refrigerator works between  $4^\circ\text{C}$  and  $30^\circ\text{C}$ . It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is (Take,  $1 \text{ cal} = 4.2 \text{ Joules}$ )  
 → NEET 2016  
 (a)  $23.65 \text{ W}$       (b)  $236.5 \text{ W}$   
 (c)  $2365 \text{ W}$       (d)  $2.365 \text{ W}$

- 42 A thermodynamic system is taken through the cycle PQRSP. The net work done by the system is



- (a)  $20 \text{ J}$       (b)  $-20 \text{ J}$       (c)  $400 \text{ J}$       (d)  $-374 \text{ J}$
- 43 The maximum velocity of a simple harmonic motion represented by  $y = 3 \sin\left(100t + \frac{\pi}{6}\right)$  is given by  
 (a)  $300$       (b)  $\frac{3\pi}{6}$       (c)  $100$       (d)  $\frac{\pi}{6}$
- 44 A particle executing simple harmonic motion of amplitude 5 cm has maximum speed of  $31.4 \text{ cms}^{-1}$ . The frequency of its oscillation is  
 (a)  $3 \text{ Hz}$       (b)  $2 \text{ Hz}$       (c)  $4 \text{ Hz}$       (d)  $1 \text{ Hz}$
- 45 The phase difference between two waves, represented by

$$y_1 = 10^{-6} \sin\left[100t + \left(\frac{x}{50}\right) + 0.5\right] \text{ m}$$

$$y_2 = 10^{-6} \cos\left[100t + \left(\frac{x}{50}\right)\right] \text{ m}$$

where,  $x$  is expressed in metre and  $t$  is expressed in second, is approximately

- (a)  $1.07 \text{ rad}$       (b)  $2.07 \text{ rad}$       (c)  $0.5 \text{ rad}$       (d)  $1.5 \text{ rad}$

**SUBJECT: CHEMISTRY (SRB 3, Monday, 21.12.25)**

**Topic: Basic Concepts in Chemistry, Atomic Structure, Periodic Classification, Chemical Bonding, Thermodynamics, Equilibrium, Redox Reactions, Solutions, Electrochemistry, Chemical Kinetics, General Organic Chemistry, Hydrocarbons, Haloalkanes and Haloarenes, Alcohols & Phenols**

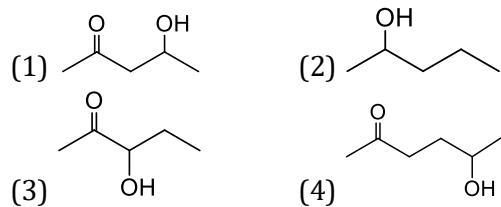
46.  $\text{CH}_2\text{ClCH}_2\text{OH}$  is stronger acid than  $\text{CH}_3\text{CH}_2\text{OH}$  because:

- (1) +IE of Cl disperses -ve charge on O -atom to produce more stable anion
- (2) -IE of Cl disperses -ve charge on O -atom to produce more stable anion
- (3) +IE of Cl increases - ve charge on O -atom to alcohol
- (4) None of the above

47. Alcohol  $(\text{CH}_3)_2\text{CHCH}_2\text{OH}$  cannot be obtained by

- (1)  $\text{HCHO} + (\text{CH}_3)_2\text{CHCH}_2\text{MgX}$
- (2)  $\begin{array}{c} \text{CH}_2-\text{CH}_2 \\ | \\ \text{O} \end{array} + (\text{CH}_3)_2\text{CHMgX}$
- (3)  $(\text{CH}_3)_2\text{CHCH}_2\text{CH}_2\text{MgX} + \text{O}_2$  air
- (4)  $(\text{CH}_3)_2\text{CHCHO} + \text{CH}_3\text{MgX}$

48. Which one of the following will most readily be dehydrated in acidic condition?



49. Ethyl alcohol reacts with following to form a compound of fruity smell:

- (1)  $\text{PCl}_5$
- (2)  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$
- (3)  $\text{CH}_3\text{COOH}$
- (4)  $\text{CH}_3\text{COCH}_3$

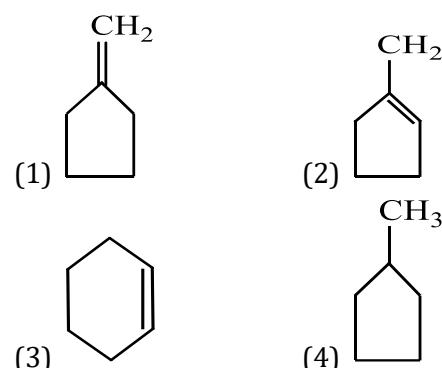
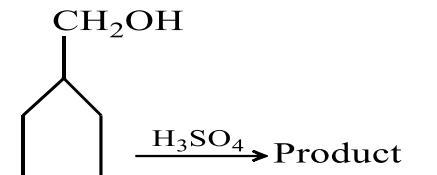
50. 2-methyl-2-butanol on treatment with HCl gives predominantly

- (1) 2-chloro-3-methylbutane
- (2) 2,2-dimethylpentane
- (3) 2-chloro-2-methylbutane
- (4) 1-chloro-2-methylbutane

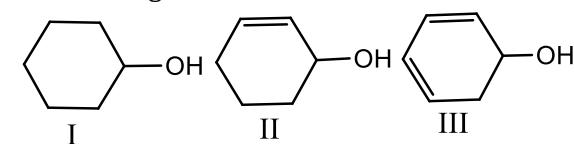
51. Which of the following reacts fastest with a mixture of anhydrous  $\text{ZnCl}_2$  and conc. HCl?

- (1) Trimethyl carbinol
- (2) Ethanol
- (3) Propanol
- (4) Methanol

52. The product in the given reaction is:

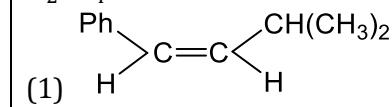


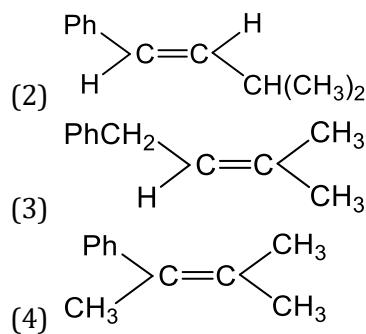
53. The correct order of ease of dehydration of following is



- (1) I > II > III
- (2) III > II > I
- (3) I > III > II
- (4) III > I > II

54. The major product in the reaction of  $\text{PhCH}_2\text{CH}(\text{OH})\text{CH}(\text{CH}_3)_2$  with concentrated  $\text{H}_2\text{SO}_4$  is

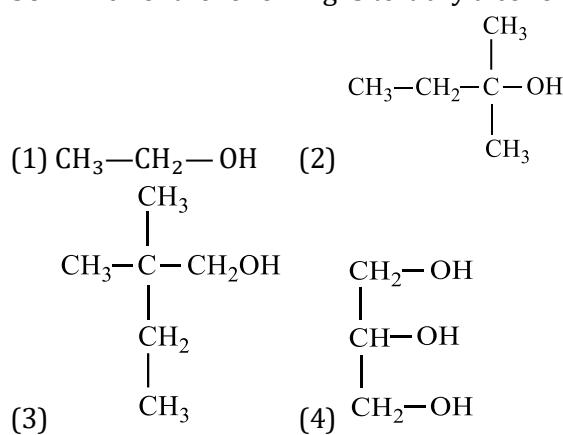




55. Which is not an alcohol?

- (1)  $\text{CH}_2=\text{CHCH}_2\text{OH}$  (2)  $\text{CH}_2\text{OHCH}_2\text{OH}$   
 (3)  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$  (4)  $\text{C}_6\text{H}_5\text{OH}$

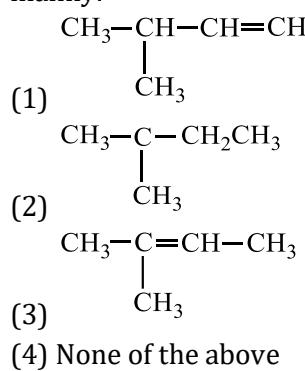
56. Which of the following is tertiary alcohol?



57. Among the following, which is least acidic?

- (1) Phenol (2) *o*-cresol  
 (3) *p*-nitrophenol (4) *p*-chlorophenol

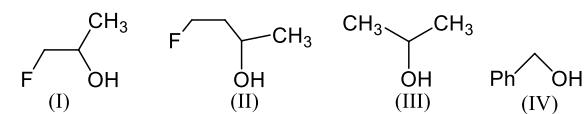
58. The dehydration of neo-pentanol gives mainly:



59. Phenol, when it first reacts with concentrated sulphuric acid and then with concentrated nitric acid, gives

- (1) 2, 4, 6-trinitrobenzene  
 (2) *o*-nitrophenol  
 (3) *p*-nitrophenol  
 (4) Nitrobenzene

60. The order of reactivity of the following alcohols



- (1) I > II > III > IV (2) I > III > II > IV  
 (3) IV > III > II > I (4) IV > III > I > II

61. How many structural isomers are known for  $\text{C}_4\text{H}_{10}\text{O}$ ?

- (1) 4 (2) 3 (3) 6 (4) 7

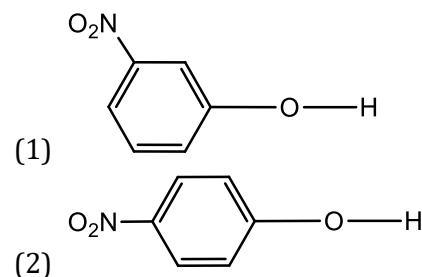
62. Amongst the following, HBr reacts fastest with

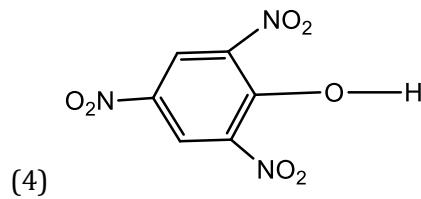
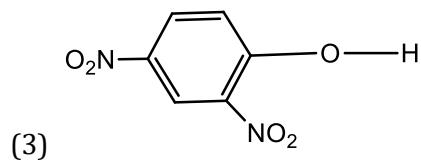
- (1) Propane-1-ol  
 (2) Propane-2-ol  
 (3) 2-methyl propane-1-ol  
 (4) 2-methyl propane-2-ol

63. Ethyl iodide on treatment with dry  $\text{Ag}_2\text{O}$  will yield:

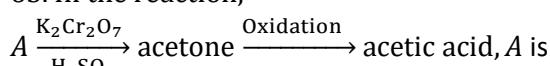
- (1) Ethyl alcohol (2) Diethyl ether  
 (3) Ethyl methyl ether (4) Ethylene

64. Which of the following compounds is weakest acid?



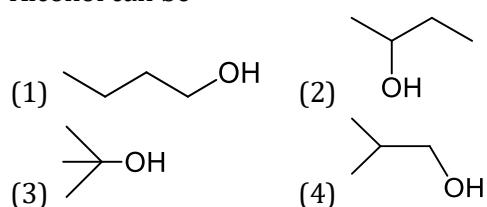


65. In the reaction,

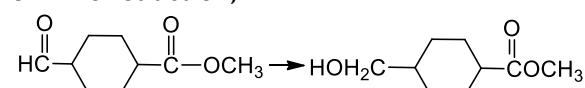


- (1) 1-propanol      (2) 2-butanol  
 (3) 2-propanol      (4) Ethanol

66.  $\text{C}_4\text{H}_{10}\text{O}$  gives white precipitate within 5 min with concentrated hydrochloric acid in the presence of anhydrous zinc chloride. Alcohol can be



67. The reduction,



Can be achieved by using

- (1)  $\text{NaBH}_4$       (2)  $\text{LiAlH}_4$   
 (3)  $\text{CuO} \cdot \text{CuCN}_2\text{O}_4$       (4) None of these

68. Which of the following reagents can convert acetic acid into ethanol?

- (1)  $\text{Sn} + \text{HCl}$       (2)  $\text{H}_2 + \text{Pt}$   
 (3)  $\text{LiAlH}_4 + \text{ether}$       (4)  $\text{Na} + \text{alcohol}$

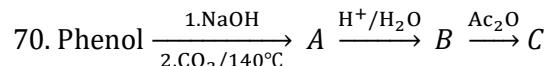
69. Which one of the following is not the characteristic of the alcohols?

- (1) Their boiling points rise fairly uniformly with a rise in molecular weight

(2) Lower members have a pleasant smell but burning taste and the higher ones are odourless and tasteless

(3) There are lighter than water

(4) Lower members are insoluble in water and organic solvents but the solubility goes on increasing with the rise of molecular weight



In this reaction, the end product  $C$  is

- (1) Salicylaldehyde      (2) Salicylic acid  
 (3) Phenyl acetate      (4) Aspirin

71. A 0.01M NaOH solution offered a resistance of 30 ohm in a conductivity cell. If the cell constant is  $0.30 \text{ cm}^{-1}$ , what is the molar conductivity of NaOH at this concentration?

- (1)  $1000 \text{ ohm}^{-1}\text{cm}^2 \text{ mol}^{-1}$   
 (2)  $2000 \text{ ohm}^{-1}\text{cm}^2 \text{ mol}^{-1}$   
 (3)  $500 \text{ ohm}^{-1}\text{cm}^2 \text{ mol}^{-1}$   
 (4)  $100 \text{ ohm}^{-1}\text{cm}^2 \text{ mol}^{-1}$

72. A 4 L gas mixture of propane and butane on complete combustion at  $25^\circ\text{C}$  produced 14 L  $\text{CO}_2$ . The composition ratio of propane to butane is:

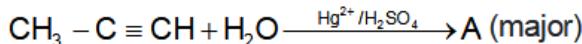
- (1) 2 : 3      (2) 1 : 2  
 (3) 1 : 4      (4) 1 : 1

73. How many spectral lines are observed for a hydrogen atom in the visible region when the electron transitions take place from seventh energy level to the energy level having  $-13.6 \text{ eV}$  energy:

- (1) 21      (2) 6  
 (3) 5      (4) 12

74. Let 'x' be the number of sigma bonds and 'y' be the number of pi bonds that are present in

the molecule A, then the value of  $(2y + x)$  will be;



- |        |        |
|--------|--------|
| (1) 10 | (2) 8  |
| (3) 19 | (4) 11 |

75. Statement I: Boron and oxygen have larger ionization energies as compared to beryllium and nitrogen respectively.

Statement II: Mg has higher ionisation energy than Na and Al.

- (1) Statement I and Statement II both are correct.
- (2) Statement I is correct, but Statement II is incorrect.
- (3) Statement I is incorrect, but Statement II is correct.
- (4) Statement I and Statement II both are incorrect.

76. How many relations is/are correct:

(I)  $\Delta H = \Delta G - T\Delta S$

(II)  $\Delta H = \Delta E + \Delta n_g RT$

(III)  $\Delta G^\circ = -RT\ln K$

(IV)  $K_c = K_p(RT)^{\Delta n(g)}$

- |       |       |
|-------|-------|
| (1) 2 | (2) 4 |
| (3) 3 | (4) 1 |

77. Match the column:

- |                                     |                             |
|-------------------------------------|-----------------------------|
| Pair                                | Identical property          |
| (a) $\text{B}_2$ & $\text{O}_2$     | (P) Number of $\sigma$ Bond |
| (b) $\text{CN}^-$ & $\text{NO}^+$   | (Q) Bond order              |
| (c) $\text{H}_2$ & $\text{Li}_2$    | (R) Number of unpaired e-   |
| (d) $\text{N}_2^+$ & $\text{O}_2^+$ | (S) Paramagnetic in nature  |
| (1) a-R, b-P, c-Q, R, d-Q,S         |                             |
| (2) a-Q,R,S, b-P,R, c-Q,S, d-Q,R,S  |                             |
| (3) a-R,S, b-P,Q, c-P,Q, d-Q,R,S    |                             |
| (4) a-P,R,S, b-P,Q, c-Q,R, d-P,Q    |                             |

78. Which of the following is incorrect?

(1) Lycine, Arginine and Histidine are basic amino acid

(2) Deficiency of vitamin B2 causes cheilosis

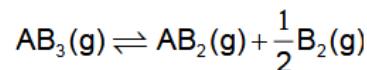
(3) Deficiency of vitamin B6 causes convulsions

(4) Deficiency of vitamin B2 causes Beri beri

79. A non-ideal solution was prepared by mixing 30 mL chloroform and 50 mL acetone. The volume of mixture will be :-

- |               |                  |
|---------------|------------------|
| (1) $> 80$ mL | (2) $< 80$ mL    |
| (3) $= 80$ mL | (4) $\geq 80$ mL |

80.  $\text{AB}_3$  (g) is dissociates as



When the initial pressure of  $\text{AB}_3$  is 800 torr and the total pressure developed at equilibrium is 900 torr. What percentage of  $\text{AB}_3$  (g) is dissociated.

- |         |            |
|---------|------------|
| (1) 75% | (2) 20%    |
| (3) 25% | (4) 88.88% |

81. Number of hydrogen atoms per molecule of a hydrocarbon A having 85.8% carbon is (Given : Molar mass of A = 84 g mol )

- |        |       |
|--------|-------|
| (1) 12 | (2) 8 |
| (3) 6  | (4) 2 |

82. Match the column

| Column-I<br>(Element)              | Column-II<br>(At. No.) |
|------------------------------------|------------------------|
| (i) Ds                             | (a) 45                 |
| (ii) Rh                            | (b) 110                |
| (iii) Am                           | (c) 60                 |
| (iv) Nd                            | (d) 95                 |
| (1) (i-b), (ii-a), (iii-d), (iv-c) |                        |
| (2) (i-b), (ii-c), (iii-d), (iv-a) |                        |
| (3) (i-d), (ii-c), (iii-b), (iv-a) |                        |
| (4) (i-d), (ii-b), (iii-a), (iv-c) |                        |

83. Half life of a chemical reaction at a particular concentration is 50 min. When the concentration of the reactant is doubled, the

half life becomes 100 min. What is the order of reaction?

- |                  |                 |
|------------------|-----------------|
| (1) First order  | (2) Zero order  |
| (3) Second order | (4) Third order |

84. Higher yield of NO in

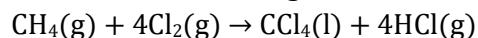
$\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$  can be obtained at ( $\Delta H$  of the reaction = +180.7 kJ/mol)

- A. Higher temperature
- B. Lower temperature
- C. Higher concentration of  $\text{N}_2$
- D. Higher concentration of  $\text{O}_2$

Choose the correct answer from the options given below:

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

85. What is the change in oxidation number of carbon in the following reaction?



- |             |              |
|-------------|--------------|
| (1) 0 to +4 | 2) -4 to +4  |
| (3) 0 to -4 | (4) +0 to +4 |

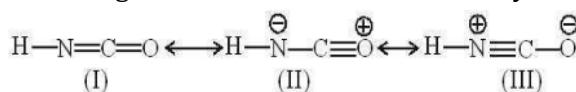
86. Which amongst the following reactions of alkyl halides produces isonitrile as a major product?

- (A)  $\text{R}-\text{X} + \text{HCN} \rightarrow$
- (B)  $\text{R}-\text{X} + \text{AgCN} \rightarrow$
- (C)  $\text{R}-\text{X} + \text{KCN} \rightarrow$
- (D)  $\text{R}-\text{X} + \text{NaCN} \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{H}_2\text{O}}$

Choose the most appropriate answer from the options given below:

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

87. HNCO (isocyanic acid) has following resonating structures the order of stability is:



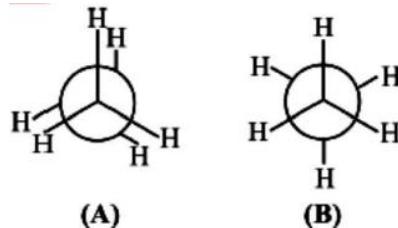
(1) I > III > II

(2) I > II > III

(3) II > III > I

(4) II > I > III

88. Incorrect statement for A and B is :-



(1) A have more energy than B.

(2) B have less torsional strain than A.

(3) A have more steric strain than B.

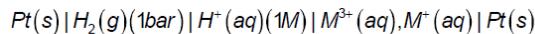
(4) B is less stable than A.

89. Assertion (A) :- When same quantity of heat is added to the system reversibly, then entropy change is inversely proportional to the temperature.

Reason (R) :- A system at higher temperature has greater randomness in it than one at lower temperature.

- (1) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
- (2) (A) is correct but (R) is not correct
- (3) (A) is incorrect but (R) is correct
- (4) Both (A) and (R) are correct and (R) is the correct explanation of (A)

90.



The  $E_{\text{cell}}$  for the given cell is 0.1115 V at 298 K when

$$\frac{[\text{M}^+(\text{aq})]}{[\text{M}^{3+}(\text{aq})]} = 10^3.$$

The value of a is.

$$\text{Given : } E_{\text{M}^{3+}/\text{M}^+}^0 = 0.2\text{V}, \quad \frac{2.303RT}{F} = 0.059\text{V}$$

- |       |       |       |       |
|-------|-------|-------|-------|
| (1) 2 | (2) 3 | (3) 1 | (4) 5 |
|-------|-------|-------|-------|

**SRB3-22.12.25 TOPIC-UNIT 3 & 4 ,SEXUAL .RE**

**91.Which of the following statements regarding coenzymes and prosthetic groups of enzymes is not true?**

- (a) Both are required for enzyme action
- (b) Both can be separated from enzyme by dialysis
- (c) Both are organic compounds
- (d) Both are polypeptides

**92. Glycogen is most structurally similar to**

- (a) Glucose      (b) Starch
- (c) Maltose      (d) Cellulose

**93.Carbohydrates are commonly found as starch in plant storage organs. Which of the following five properties of starch (a-e) make it useful as a storage material?**

- (A) Easily translocated?
- (B) Chemically non-reactive
- (C) Easily digested by animals
- (D) Osmotically inactive
- (E) Synthesized during photosynthesis.

The useful properties are

- |                      |                 |
|----------------------|-----------------|
| (a) (B) and (C)      | (b) (B) and (D) |
| (c) (A), (C) and (E) | (d) (A) and (E) |

**94. Enzymes which use ribose as substrates**

- (a) Enzymes which used ribose as substrates
- (b) Enzymes working on DNA
- (c) Nucleic acid with enzymatic activity
- (d) Enzyme -RNA complexes

**95.In an organism, enzymes generally have**

- (a) Same pH and temperature optima
- (b) Same pH but different temperature optima
- (c) Different pH but same temperature optima
- (d) Different pH and different temperature optima

**96.The  $K_m$  of an enzyme is**

- (a) One half of the  $V_{max}$
- (b) A dissociation constant
- (c) The substrate concentration that gives maximal velocity
- (d) The substrate concentration that gives half maximal velocity

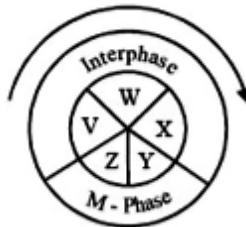
**97.Synapsis is pairing of**

- (a) Any two chromosomes
- (b) Non homologous chromosomes
- (c) Acentric chromosomes
- (d) Homologous chromosomes

**98.In an organism, if the normal diploid number of chromosomes is 8, how many chromatids are present in each daughter cell at the end of meiosis I**

- (a) 2      (b) 4      (c) 8      (d) 16

**99.The diagram below shows a cell cycle.**



**Which of the following process occur during V?**

- (a) Replication of DNA
- (b) Replicatoin of centrioles
- (c) Chromosomes condense and become shorter and thicker
- (d) High metabolic rate and synthesis of proteins and cellular organelles

**100.Spindle fibres attach on to:**

- (a) Telomere of the chromosome
- (b) Kinetochore of the chromosome
- (c) Centromere of the chromosome
- (d) NOR of the chromosome

**101.When synapsis is complete all along the chromosome, the cell is said to have entered a stage called**

- (a) Zygotene      (b) Pachytene
- (c) Diplotene      (d) Diakinesis

**102.Select the correct answer regarding the phase of meiosis and their respective events using the lists given below:**

| List I (Phase of meiosis) |              | List II (Event over occurs)           |
|---------------------------|--------------|---------------------------------------|
| (1)                       | Prophase I   | Crossing over occurs                  |
| (2)                       | Metaphase II | Sister chromatids migrate to opposite |
| (3)                       | Anaphase I   | Homologous line up at equator in      |

- (a) 1, 2 and 3 are correct
- (b) 1 and 2 are correct, 3 is false
- (c) 1 is correct, 2 and 3 are false
- (d) 1 and 3 are correct. 2 is false

103. With reference to factors affecting the rate of photosynthesis, which of the following statements is not correct?

- (a) Tomato is a greenhouse crop which can be grown in CO<sub>2</sub>- enriched atmosphere for higher yield
- (b) Light saturation for CO<sub>2</sub> fixation occurs at 10% of full sunlight
- (c) Increasing atmospheric CO<sub>2</sub> concentration up to 0.05% can enhance CO<sub>2</sub> fixation rate
- (d) C<sub>3</sub> plants respond to higher temperatures with enhanced photosynthesis while C<sub>4</sub> plants have much lower temperature optimum

104. Phosphoenol pyruvate (PEP) is the primary CO<sub>2</sub> acceptor in:

- |  |                           |
|--|---------------------------|
| (a) C <sub>3</sub> and C <sub>4</sub> plants | (b) C <sub>3</sub> plants |
| (c) C <sub>4</sub> plants                    | (d) C <sub>2</sub> plants |

105. Oxygen is not produced during photosynthesis by

- |                            |            |
|----------------------------|------------|
| (a) Cycas                  | (b) Nostoc |
| (c) Green sulphur bacteria | (d) Chara  |

106. Which of the following is not a product of light reaction of photosynthesis?

- |           |            |
|-----------|------------|
| (a) NADPH | (b) NADH   |
| (c) ATP   | (d) Oxygen |

107. The oxygenation activity of RuBisCo enzyme in photorespiration leads to the formation of:

- (a) 1 molecule of 3-C compound and 1 molecule of 2-C compound
- (b) 2 molecules of 3-C compound
- (c) 1 molecule of 3-C compound
- (d) 1 molecule of 6-C compound

108. In light reaction, plastoquinone facilitates that transfer of electrons from

- (a) PS-I to ATP synthase
- (b) PS-II to Cytb<sub>6f</sub> complex
- (c) Cytb<sub>6f</sub> complex to PS-I
- (d) PS-I to NADP<sup>+</sup>

109. Which of the following steps is common between aerobic and anaerobic respiration?

- (a) TCA/Kreb's cycle
- (b) ETS
- (c) EMP pathway/Glycolysis
- (d) photo oxidation

110. Glyceraldehyde 3-phosphate (PGALD or GAP) is oxidised during glycolysis. What happen to the hydrogen atom and the electron that are removed during its oxidation?

- (a) They reduce NAD<sup>+</sup>
- (b) They oxidise NAD
- (c) They are transferred to pyruvic acid
- (d) they are removed

111. The net gain of glycolysis of one molecule of glucose is the formation of

- (a) 2NADH + H<sup>+</sup> + 4ATP + 1 Pyruvic acid
- (b) 2NADH + 2H<sup>+</sup> + 2ATP + 2 Pyruvic acid
- (c) 8ATP + 2NADH + H<sup>+</sup> + 2 Pyruvic acid
- (d) 8ATP + 2NADH + H<sup>+</sup> + 2 Pyruvic acid + CO<sub>2</sub>

112. In Kreb's cycle, FAD participates as electron acceptor during the conversion of

- (a) Succinyl CoA to Succinic acid
- (b)  $\alpha$ -ketoglutarate to succinyl CoA
- (c) Succinic acid to fumaric acid
- (d) Fumaric acid to malic acid

113. A single turn of Krebs cycle yields

- (a) 1 FADH<sub>2</sub>, 2 NADH<sub>2</sub> and 1 ATP
- (b) 2 FADH<sub>2</sub>, 2 NADH<sub>2</sub> and 2 ATP
- (c) 1 FADH<sub>2</sub>, 3 NADH<sub>2</sub> and 1 ATP
- (d) 1 FADH<sub>2</sub>, 1 NADH<sub>2</sub> and 1 ATP

114. The substrate for Kreb's cycle is:

- (a) Pyruvic acid
- (b) Oxaloacetic acid
- (c)  $\alpha$  ketoglutaric acid
- (d) Citric acid

115. Correct sequence of different phases of growth is

- (a) Cell division, Cell differentiation, Cell elongation
- (b) Cell differentiation, Cell division, Cell elongation
- (c) Cell elongation, Cell division, Cell differentiation
- (d) Cell division, Cell elongation, Cell differentiation

116. The growth in plants differs from growth in animals because it is

- (a) Intrinsic in the former
- (b) Extrinsic in the former
- (c) Indeterminate in the former
- (d) Indefinite in the latter

117. When growth is going on at a slow rate in geometrical growth curve, the phase is known as

- (a) Lag period (b) Log period
- (c) Period of diminishing growth
- (d) linear phase of growth

118. Match the Column I with the Column II by choosing the correct combination of alphabets from the choices given below

|   | Column - I |    | Column - II       |
|---|------------|----|-------------------|
| A | Auxins     | p. | Herring sperm DNA |
| B | ABA        | q. | Bolting           |
| C | Ethylene   | r. | Stomatal closure  |
| D | GA         | s. | Weed-free lawns   |
| E | Cytokinins | t. | Ripening of fruit |

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

119. Match the items of column I and column II

|    | Column I    |    | Column II          |
|----|-------------|----|--------------------|
| A. | Axuin       | p. | GA <sub>3</sub>    |
| B. | Gibberellin | q. | Indole acetic acid |
| C. | Cytokinin   | r. | Stress hormone     |
| D. | ABA         | s. | Zeatin             |

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

(c) A - q, B - p, C - s, D - r

(d) A - q, B - s, C - r, D - p

120. During mid - 1960s, three independent researchers reported the purification and chemical characterisation of three different kinds of inhibitors namely

- (a) Inhibitor - B, abscission II and dormin
- (b) Inhibitor - B, abscission I and kinetin
- (c) Inhibitor - A, abscission II and zeatin
- (d) Inhibitor - B, abscission I and dormin

121. Pollen-pistil interaction includes all the events

- (a) That occurs between pollen grain and stigma
- (b) From the deposition of pollen grain on the stigma till the last stage of fertilization
- (c) Occur within the pistil
- (d) From the deposition of pollen grain on the stigma till pollen tube enters the ovule

122. If seeds possess endosperm then they are classified under

- (a) Albuminous seeds
- (b) Ex-albuminous seeds
- (c) Endospermic seeds (d) Both (a) and (c)

123. Perisperm i.e. residual persistent nucellus is seen in

- (a) Black pepper (b) Beet
- (c) Castor (d) Both (a) and (b)

124. Which of the following group of plants produces both chasmogamous and cleistogamous flowers

- (a) *Viola* and *Commelina*
- (b) *Hibiscus* and *Oxalis*
- (c) *Commelina* and *Sunflower*
- (d) *Oxalis* and *Vallisneria*

125. Compare the statement A and B

Statement A: Autogamy results in genetic variations

Statement B: Xenogamy results in greater genetic variations than geitenogamy Select the correct description

- (a) Statement A and Statement B are correct
- (b) Both statement A and B are incorrect
- (c) Statement A is correct and statement B is
- (d) Wrong Statement A is wrong and statement B is correct

126.Mathematically , the arithmetic growth is expressed as

- (a)  $L_t = L_0 + rt$
- (b)  $L_t = L_0 + rt$
- (c)  $R_t = L_0 + L_1$
- (d)  $L_0 = L_1 - rt$

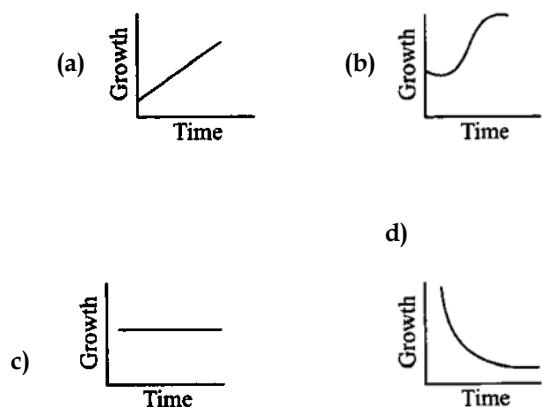
127.Both progeny cells formed by mitotic division of a cell retain the ability to divide and continue to do so during

- (a) Lag phase
- (b) Log phase
- (c) Stationary phase
- (d) Senescence phase

128.The exponential phase can be expressed as

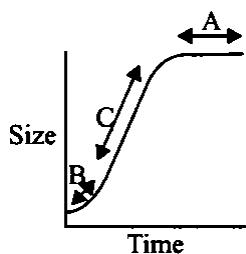
- (a)  $W_t = W_0 e^{rt}$
- (b)  $W_t = W_1 e^{rt}$
- (c)  $L_0 = L_0 + rt$
- (d)  $Rt = L_0 + L_1$

129.Which one is the correct graph for arithmetic growth



130.The graph is drawn on the parameters of growth versus time. What do A, B and C respectively represent?

- (a) Exponential phase, log phase and steady state phase
- (b) Steady state phase, lag phase and log phase
- (c) Log phase, steady phase and logarithmic phase
- (d) Log phase, lag phase and steady phase



131.A primary root grows from 5cm to 19 cm in a week. Calculate the actual growth rate (AGR) and relative growth rate (RGR) over the period.

AGR

RGR

- |     |        |        |
|-----|--------|--------|
| (a) | 14 cm  | 2.8 cm |
| (b) | 14 cm  | 3.8 cm |
| (c) | 3.8 cm | 14 cm  |
| (d) | 24 cm  | 2.8 cm |

132.What does a bivalent consists of?

- (a) Two chromatids and one centromere
- (b) Four chromatids and two centromeres
- (c) Four chromatids and four centromeres
- (d) Two chromatids and one centromere

133.Crossing over occurs between

- (a) Two different bivalents
- (b) Sister chromatids of same chromosomes
- (c) Two daughter nuclei
- (d) Non sister chromatids of a bivalent

134.All naturally occurring lipids on hydrolysis yield

- (a) Fatty acid and glycerol
- (b) Fatty acid with alcohol
- (c) An acid and alcohol
- (d) An acid and an organic solvent

135.Triglycerides are

- (a) Simple lipids    (b) Compound lipids
- (c) Derived lipids    (d) Steroids

## ZOOLOGY

(Human physiology, Human rep., Rep., health, Human health and disease, Prin., of inheritance, Biotech: Principles)

DATE:21/12/2025

136) The figure given below shows three stages in the cardiac cycle.



Which of the following sequences is correct regarding this?

- (1) 2, 3, 1      (2) 1, 2, 3  
(3) 2, 1, 3      (4) 3, 1, 2

137) Consider the pressure changes within the human heart during a complete cardiac cycle. At what specific point in time would the pressure inside the left ventricle first exceed the pressure in the left atrium, and what is the immediate anatomical consequence of this pressure differential?

- (1) At the very onset of ventricular systole; Closure of the bicuspid valve.  
(2) During the T-wave; Closure of the tricuspid valve.  
(3) Immediately after the P-wave; Opening of the aortic semilunar valve.  
(4) Just after the QRS complex, Relaxation of the left atrium.

138) Hb most strongly combines with :-

- (1) CO<sub>2</sub>      (2) CO      (3) O<sub>2</sub>      (4) O<sub>3</sub>

139) The nerve impulses which stimulate the intercostal muscles and diaphragm to permit breathing, originate in the:-

- (1) Cerebellum      (2) Pons  
(3) Hypothalamus      (4) Medulla oblongata

140) Read the following statements A-D

- A. Our vertebral column is formed by 26 serially arranged units called vertebrae and is ventrally placed.  
B. Vertebral column extends from the base of the skull and constitutes the main frame work of the trunk.  
C. Each vertebra has a central hollow portion (neural canal) through which the spinal cord passes.  
D. First vertebra is axis and it articulates with the occipital condyles

How many of the above statements are correct?

- (1) Four      (2) Three      (3) Two      (4) One

141) Which of the following statements are correct?

- (i) Muscle contraction is initiated by a signal sent by motor neuron of CNS .  
(ii) During muscle contraction, isotropic band gets elongated.  
(iii)The dark band contains only myosin filament.  
(iv)A motor neuron along with the muscle fibres connected to it constitute a motor unit.  
(1) (i) and (ii) are correct      (2) (ii) and (iii) are correct  
(3) (iii) and (iv) are correct      (4) (i) and (iv) are correct

142) Under normal conditions which one is completely reabsorbed in the renal tubule?

- (1) Salts      (2) Urea      (3) Glucose      (4) Uric acid

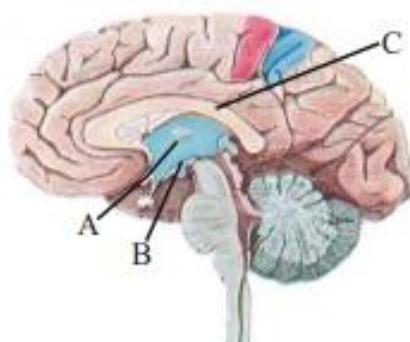
143) Select the incorrect statement from the following:

- (1) The DCTs of many nephrons opens into a straight tube called collecting duct.  
(2) In cortical nephrons (majority), the loop of Henle is too short and extended only very little in medulla.  
(3) In juxta medullary nephrons (minority), the loop of Henle is very long and runs deeply into medulla.  
(4) Vasa recta is not a part of peritubular network.

144) Association area are :-

- (1) Sensory area found in deep part of cerebral cortex.  
(2) Motor area found in surface layer of grey matter of cerebrum.  
(3) Neither clearly sensory nor motor found in grey matter of cerebrum.  
(4) Hypothalamic neurons which secrete hormones.

145) Given below is diagrammatic sketch of a sagittal section of the human brain. Identify A, B and C with their correct function



|   | A  | B  | C  |
|---|--|--|--|
| 1 | Thalamus<br>(Coordinating centre for Sensory and Motor Neuron)     | Corpus callosum<br>(Connects cerebral hemispheres) | Hypothalamus<br>(Body temperature)                             |
| 2 | Hypothalamus<br>(Coordinating centre for Sensory and Motor Neuron) | Corpus callosum<br>(Connects cerebral hemispheres) | Thalamus<br>(Body temperature)                                 |
| 3 | Thalamus<br>(Coordinating centre for Sensory and Motor Neuron)     | Hypothalamus<br>(Body temperature)                 | Corpus callosum<br>(Connects cerebral hemispheres)             |
| 4 | Corpus callosum<br>(Connects cerebral hemispheres)                 | Hypothalamus<br>(Body temperature)                 | Thalamus<br>(Coordinating centre for Sensory and Motor Neuron) |

149) Read the given statements and choose correct option about them:-

- (A) Each lobule of testis contains one to three highly coiled seminiferous tubules and it is lined inside by only columnar cells
- (B) The vasa efferentia leave the testis and open into vas deferens
- (C) Epididymis is located along the posterior surface of each testis
- (D) Seminal plasma is rich in fructose, calcium and certain enzymes.

|   | A     | B     | C     | D     |
|---|-------|-------|-------|-------|
| 1 | True  | False | True  | True  |
| 2 | False | False | True  | True  |
| 3 | False | False | False | False |
| 4 | True  | True  | False | False |

150) If ampulla of mammary gland is blocked, the milk will not go from:-

- (1) Alveoli to mammary duct
- (2) Mammary tubule to mammary duct
- (3) Mammary duct to lactiferous duct
- (4) Mammary duct to mammary tubule

151) How many structures in the list given below are haploid?

(Spermatid, secondary oocyte, primary spermatocyte, ovum, sperm, oogonia, spermatogonia, polar body)

- (1) Six
- (2) Four
- (3) Two
- (4) Five

152) How many sperm and ova will produce from 40 spermatogonium and 40 oogonium respectively.

- (1) 160 sperm and 160 ova
- (2) 40 sperm and 140 ova
- (3) 160 sperm and 40 ova
- (4) 40 sperm and 40 ova

153) In gel electrophoresis, separated bands of DNA are cut out from the agarose gel and extracted from the gel pieces. This step is known as:-

- (1) Blotting
- (2) Elution
- (3) Cloning
- (4) Tagging

154) Which enzyme is used in PCR technique?

- (1) Thermostable DNA polymerase
- (2) Thermostable RNA polymerase
- (3) Thermostable ligase
- (4) Thermostable vector

155) The basic procedure involved in the synthesis of recombinant DNA molecule is depicted below. The mistake in the procedure is:-

146) Alveolar growth in mammary gland is function of:-

- (1) Thyroxine
- (2) Progesteron
- (3) ANF
- (4) Oxytocin

147) Assertion: Hormones are nutrient substances which act as intercellular messenger.

Reason: Hormones are produced in large amount.

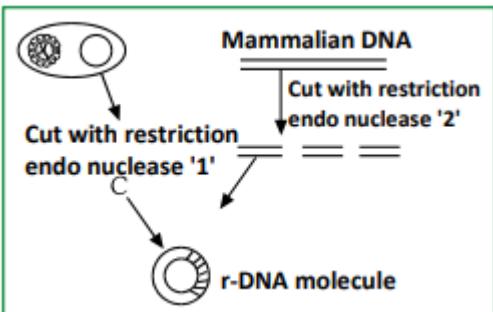
- (1) Both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (2) Both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (3) The assertion is true but the reason is false.
- (4) Both the assertion and reason are false.

148) Fill in the blanks:

A. Oral contraceptive pills have to be taken daily for a period of ...A... starting preferably within the first ...B... of menstrual cycle.

B. In Lactational amenorrhea method has been reported to be effective only up to a maximum period of ...C... following parturition.

- (1) A-21 days, B-7 days, C-9 months
- (2) A-28 days, B-7 days, C-8 months
- (3) A-14 days, B-5 days, C-6 months
- (4) A-21 days, B-5 days, C-6 months



- (1) Enzyme polymerase is not included  
 (2) The mammalian DNA is shown double stranded  
 (3) Only one fragment is inserted  
 (4) Two different restriction enzymes are used
- 156) Which of the following tools of recombinant DNA technology is incorrectly paired with its use?  
 (1) Restriction enzyme - Production of RFLPs  
 (2) DNA ligase - that cuts DNA, creating the sticky ends  
 (3) DNA polymerase - used in a polymerase chain reaction to amplify section of DNA  
 (4) reverse transcriptase - production of cDNA from mRNA
- 157) The colonies of recombinant bacteria do not produce colour in contrast to blue colonies of non-recombinant bacteria because of:-  
 (1) Inactivation of glycosidase enzyme in recombinant bacteria  
 (2) Non-recombinant bacteria containing beta-galactosidase  
 (3) Insertional inactivation of alpha-galactosidase in non-recombinant bacteria  
 (4) Insertional inactivation of beta-galactosidase in recombinant bacteria
- 158) Select the incorrect statement for continuous culture system:  
 (1) In this system, used medium is drained out from one side while fresh medium is added from other side.  
 (2) In this system, cells are maintained in their physiologically most active lag phase of growth.  
 (3) It produces larger biomass.  
 (4) It shows higher yields of desired product
- 159) You have three copies of a particular DNA molecule what technique would you use to make more copies of the molecule?  
 (1) Gel electrophoresis (2) Sequencing  
 (3) PCR (4) Restriction fragment analysis
- 160) To denature the DNA template in PCR it is heated to  
 (1) 70°C (2) 54°C (3) 80°C (4) 94°C

- 161) Alternative selectable markers developed to differentiate non-recombinants from recombinants on the basis of :-  
 (1) Ability of separate them according to size.  
 (2) Ability to produce colour in the presence of a chromogenic substrate.  
 (3) Ability to kill the host.  
 (4) None of the above
- 162) In gel electrophoresis technique the DNA fragments are forced to move through a medium towards:-  
 (1) Anode (2) Cathode  
 (3) Both (1) and (2) (4) None of the above
- 163) Taq-polymerase is used in, polymerase chain reaction, because:-  
 (1) It becomes inactive at high temperature  
 (2) It makes other enzyme active at high temperature  
 (3) It remains active during high temperature  
 (4) It is obtained from thermostable virus.
- 164) When the isolation of genetic material is done the RNA can be removed by treatment with :-  
 (1) Protease (2) Chitinase  
 (3) Ribonuclease (4) Deoxyribonuclease
- 165) First recombinant DNA was made by Stanley Cohen and Herbert Boyer in :-  
 (1) 1968 (2) 1970 (3) 1972 (4) 1974
- 166) Assertion: Continuous culture system produces a larger biomass.  
 Reason: It maintains the cells in their physiologically most active lag phase.  
 (1) Both assertion and reason are true and reason is the correct explanation of assertion.  
 (2) Both assertion and reason are true and reason is not the correct explanation of assertion.  
 (3) Assertion is true but reason is false.  
 (4) Both assertion and reason are false.
- 167) Statement-I: Bioreactors have volume of 100-1000 litres.  
 Statement-II: They provide optimal conditions for achieving the desired product by providing optimum growth conditions.  
 (1) Both statement I and statement II are correct.  
 (2) Both statement I and statement II are incorrect.  
 (3) Statement I is correct but statement II is incorrect.  
 (4) Statement I is incorrect but statement II is correct.

168) Statement-I: In PCR, multiple copies of gene of interest is synthesized in vivo.

Statement-II: Thermostable DNA polymerase is isolated from a fungus *Thermus aquaticus*.

- (1) Statement-I is correct but Statement-II is incorrect.
- (2) Both Statement-I and Statement-II are correct.
- (3) Both Statement-I and Statement-II are incorrect.
- (4) Statement-I is incorrect but Statement-II is correct

169) Primers used for the process of polymerase chain reaction are \_\_\_\_\_.

- (1) single stranded DNA oligonucleotide
- (2) double stranded DNA oligonucleotide
- (3) single stranded RNA oligonucleotide
- (4) double stranded RNA oligonucleotide

170) In pBR322, restriction site of which of the following is not present on any selectable marker site?

- (1) Pvu II      (2) Sal I      (3) Pst I      (4) Pvu I

171) What is the purpose of incubating the cells with recombinant DNA on ice and then briefly placing them at 42°C (heat shock) before putting them back on ice?

- (1) To prevent the cells from taking up the recombinant DNA.
- (2) To increase the efficiency of the bacteria to take up the recombinant DNA.
- (3) To inhibit the growth of bacteria in the cells.
- (4) To destroy the recombinant DNA in the cells.

172) If we have four different sizes of DNA fragments i.e., 500 bp, 200bp, 350bp and 100bp, which band will be present closest to the wells on an agarose gel after electrophoresis?

- (1) 350bp      (2) 100bp      (3) 200bp      (4) 500bp

173) Organisms in which the total number of chromosomes are same in both male and female, But two different types of gametes in terms of the sex chromosomes, are produced by female are :-  
(1) Human (2) Grasshopper (3) Birds (4) Honey bee

174) What will be the percentage inheritance of a disorder from an X-linked diseased father to his son.  
(1) 0%      (2) 25%      (3) 50%      (4) 100%

175) Antigen binding site in an antibody is found between:

- (1) two light chains.
- (2) two heavy chains.
- (3) one heavy and one light chain.

(4) either between two light chain or between one heavy and one light chain depending upon the nature of antigen.

176) Identify the method of cancer treatment in which tumor cells are irradiated lethally?

- (1) Surgery      (2) Radiotherapy
- (3) Chemotherapy      (4) Immunotherapy

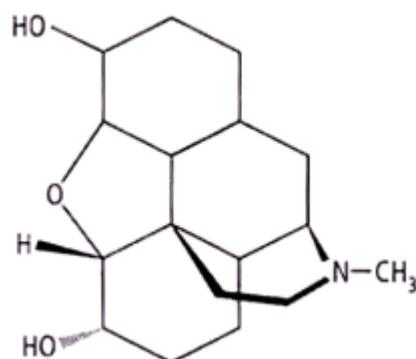
177) A person suffering from a disease caused by *Plasmodium*, experiences recurring chill and fever at the time when:

- (1) the sporozoites released from RBCs are being rapidly killed and broken down inside spleen.
- (2) the sporozoites released from WBCs are being killed instantaneously.
- (3) the parasite after its rapid multiplication inside RBCs ruptures them and releases haemozoin.
- (4) the microgametocytes and megagametocytes are being destroyed by the WBCs.

178) Read the following statements about a drug and identify the drug;

- I. These are known for their effects on cardiovascular system of the body.
- II. These interact with the receptors present principally in brain.
- III. Generally taken by inhalation and oral ingestion.
- (1) Papaver somniferum (2) Erythroxylum coca  
(3) Cannabis sativa      (4) Atropa belladonna

179) The chemical compound whose chemical structure is given below is obtained from which plant?



- (1) Papaver somniferum (2) Erythroxylum coca  
(3) Atropa belladonna      (4) Cannabis sativa

180) Ionizing radiations like X-rays and gamma rays and non-ionizing radiations like UV cause DNA damage leading to neoplastic transformation are called as:

- (1) carcinogens.      (2) oncogenes.
- (3) pollutants.      (4) mutagens.