

- 1 Two identical bodies are made of a material for which the heat capacity increases with temperature. One of these is at  $100^{\circ}\text{C}$ , while the other one is at  $0^{\circ}\text{C}$ . If the two bodies are brought into contact, then assuming no heat loss, the final common temperature is → NEET 2016

(a)  $50^{\circ}\text{C}$  (b) more than  $50^{\circ}\text{C}$   
 (c) less than  $50^{\circ}\text{C}$  but greater than  $0^{\circ}\text{C}$   
 (d)  $0^{\circ}\text{C}$

- 2 2 g of steam condenses, when passed through 40 g of water initially at  $25^{\circ}\text{C}$ . The condensation of steam raises the temperature of water to  $54.3^{\circ}\text{C}$ . What is the latent heat of steam?

(a) 540 cal/g (b) 536 cal/g  
 (c) 270 cal/g (d) 480 cal/g

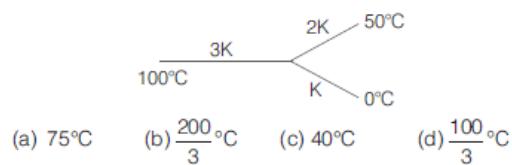
- 3 In a steady state, the temperature at the ends A and B of 20 cm long rod AB are  $100^{\circ}\text{C}$  and  $0^{\circ}\text{C}$ , respectively. The temperature of a point 9 cm from A is

(a)  $45^{\circ}\text{C}$  (b)  $60^{\circ}\text{C}$  (c)  $55^{\circ}\text{C}$  (d)  $65^{\circ}\text{C}$

- 4 The heat is flowing through a rod of length 50 cm and area of cross-section  $5 \text{ cm}^2$ . Its ends are respectively at  $25^{\circ}\text{C}$  and  $125^{\circ}\text{C}$ . The coefficient of thermal conductivity of the material of the rod is 0.092 kcal/ms. The temperature gradient in the rod is

(a)  $2^{\circ}\text{C/cm}$  (b)  $2^{\circ}\text{C/m}$  (c)  $20^{\circ}\text{C/cm}$  (d)  $20^{\circ}\text{C/m}$

- 5 Three rods of same dimensions have thermal conductivities  $3 K$ ,  $2 K$  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



- 6 The two ends of a metal rod are maintained at temperatures  $100^{\circ}\text{C}$  and  $110^{\circ}\text{C}$ . The rate of heat flow in the rod is found to be  $4.0 \text{ J/s}$ . If the ends are maintained at temperatures  $200^{\circ}\text{C}$  and  $210^{\circ}\text{C}$ , the rate of heat flow will be → CBSE AIPMT 2015

(a)  $44.0 \text{ J/s}$  (b)  $16.8 \text{ J/s}$  (c)  $8.0 \text{ J/s}$  (d)  $4.0 \text{ J/s}$

- 7 A black body is at  $727^{\circ}\text{C}$ . It emits energy at a rate which is proportional to

(a)  $(727)^2$  (b)  $(1000)^4$  (c)  $(1000)^2$  (d)  $(727)^4$

- 8 A sphere has a surface area of  $1.0\text{m}^2$  and a temperature of  $400 \text{ K}$  and the power radiated from it is  $150 \text{ W}$ . Assuming the sphere is a black body radiator, the power in kilowatt radiated when the area expands to  $2.0 \text{ m}^2$  and the temperature changes to  $800 \text{ K}$  is

(a) 6.2 (b) 9.6  
 (c) 4.8 (d) 16

- 9 Two spheres of the same material have radii  $1 \text{ m}$  and  $4 \text{ m}$ , temperature  $4000\text{K}$  and  $2000\text{K}$ , respectively. Then, the ratio of energy radiated per second by the first sphere as compared to that by the second is

(a) 4 : 1 (b) 2 : 1  
 (c) 1 : 1 (d) 1 : 4

- 10 The two ends of a rod of length  $L$  and a uniform cross-sectional area  $A$  are kept at two temperatures  $T_1$  and  $T_2$  ( $T_1 > T_2$ ). The rate of heat transfer,  $\frac{dQ}{dt}$ , through the rod in a steady state is given by → CBSE AIPMT 2009

$$(a) \frac{dQ}{dt} = \frac{KL(T_1 - T_2)}{A} \quad (b) \frac{dQ}{dt} = \frac{K(T_1 - T_2)}{LA}$$

$$(c) \frac{dQ}{dt} = KLA(T_1 - T_2) \quad (d) \frac{dQ}{dt} = \frac{KA(T_1 - T_2)}{L}$$

- 11 There are two identical vessel filled with equal amount of ice. The vessels are of different metals. If the ice melts in the two vessels in 20 min and 35 min respectively, the ratio of the coefficient of thermal conductivity of the two metals is

(a) 4 : 7 (b) 7 : 4  
 (c) 16 : 49 (d) 49 : 16

- 12 If  $\lambda_m$  denotes the wavelength at which the radiative emission from a black body at a temperature  $T \text{ K}$  is maximum, then

(a)  $\lambda_m \propto T^4$  (b)  $\lambda_m$  is independent of  $T$   
 (c)  $\lambda_m \propto T$  (d)  $\lambda_m \propto T^{-1}$

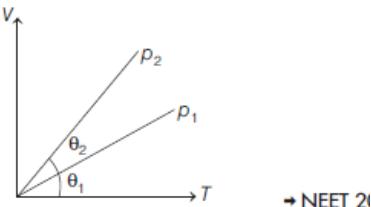
- 13 The volume of a given mass of a gas at  $27^{\circ}\text{C}$ ,  $1 \text{ atm}$  is  $100 \text{ cc}$ . What will be its volume at  $327^{\circ}\text{C}$ ?

(a)  $50 \text{ cc}$  (b)  $100 \text{ cc}$  (c)  $150 \text{ cc}$  (d)  $200 \text{ cc}$

- 14 A vessel contains 1 mole of  $\text{O}_2$  gas (molar mass 32) at temperature  $T$ . The pressure of the gas is  $p$ . An identical vessel containing 1 mole of He gas (molar mass 4) at temperature  $2T$  has a pressure of

(a)  $\frac{p}{8}$  (b)  $p$  (c)  $2p$  (d)  $8p$

- 15 In the given (V-T) diagram, what is the relation between pressures  $p_1$  and  $p_2$ ?



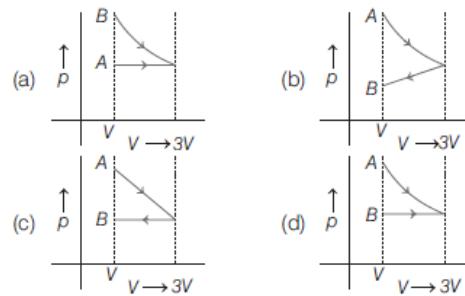
(a)  $p_2 = p_1$  (b)  $p_2 > p_1$   
 (c)  $p_2 < p_1$  (d) Cannot be predicted

- 16 Two molecules of a gas have speeds of  $9 \times 10^6 \text{ m/s}$  and  $1 \times 10^6 \text{ m/s}$ , respectively. What is the root mean square speed of these molecules?

(a)  $\sqrt{39} \times 10^6 \text{ m/s}$  (b)  $6 \times 10^6 \text{ m/s}$   
 (c)  $\sqrt{41} \times 10^6 \text{ m/s}$  (d)  $8 \times 10^6 \text{ m/s}$

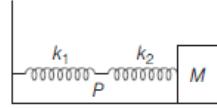
- 17 The degrees of freedom of a molecule of a triatomic gas are  
 (a) 2 (b) 4 (c) 6 (d) 8
- 18 The temperature of argon, kept in a vessel, is raised by  $1^{\circ}\text{C}$  at a constant volume. The total heat supplied to the gas is a combination of translational and rotational energies. Their respective shares are  
 (a) 60% and 40% (b) 40% and 60%  
 (c) 50% and 50% (d) 100% and 0%
- 19 4.0 g of a gas occupies 22.4 L at NTP. The specific heat capacity of the gas at constant volume is  $5.0 \text{ J K}^{-1} \text{ mol}^{-1}$ . If the speed of sound in this gas at NTP is  $952 \text{ ms}^{-1}$ , then the heat capacity at constant pressure is (Take gas constant  $R = 8.3 \text{ J K}^{-1} \text{ mol}^{-1}$ )  
 → CBSE AIPMT 2015  
 (a)  $8.0 \text{ J K}^{-1} \text{ mol}^{-1}$  (b)  $7.5 \text{ J K}^{-1} \text{ mol}^{-1}$   
 (c)  $7.0 \text{ J K}^{-1} \text{ mol}^{-1}$  (d)  $8.5 \text{ J K}^{-1} \text{ mol}^{-1}$
- 20 The ratio of the specific heats  $\frac{C_p}{C_v} = \gamma$  in terms of degrees of freedom ( $n$ ) is given by  
 → CBSE AIPMT 2015  
 (a)  $\left(1 + \frac{1}{n}\right)$  (b)  $\left(1 + \frac{n}{3}\right)$  (c)  $\left(1 + \frac{2}{n}\right)$  (d)  $\left(1 + \frac{n}{2}\right)$
- 21 If the internal energy of  $n_1$  moles of He at temperature  $10 \text{ T}$  is equal to the internal energy of  $n_2$  mole of hydrogen at temperature  $6\text{T}$ . The mole of  $\frac{n_1}{n_2}$  is  
 (a)  $\frac{3}{5}$  (b) 2 (c) 1 (d)  $\frac{5}{3}$
- 22 1 cc of water at its boiling point ( $100^{\circ}\text{C}$ ) absorbs 540 cal of heat to become steam with a volume of 1671 cc. If the atmospheric pressure is  $1.013 \times 10^5 \text{ N m}^{-2}$ , the energy spent (in cal) to overcome molecular attractive forces is nearly (mechanical equivalent of heat =  $4.2 \text{ J/cal}$ )  
 (a) 540 (b) 500 (c) 40 (d) zero
- 23 When one mole of monoatomic gas expands at constant pressure, the ratio of the heat supplied that increases the internal energy of the gas and that is used in expansion is  
 (a)  $\infty$  (b) zero (c)  $\frac{3}{2}$  (d)  $\frac{2}{3}$
- 24 In a thermodynamic process with 2 moles of gas, 30 J of heat is released and 22 J of work is done on the gas.  
 Given that initial internal energy of the sample was 20 J, what will be the final internal energy?  
 (a) 72 J (b) 32 J (c) 28 J (d) 12 J
- 25 A gas is compressed at a constant pressure of  $50 \text{ N m}^{-2}$  from a volume of  $10 \text{ m}^3$  to a volume of  $4 \text{ m}^3$ . Energy of 100 J is then added to the gas by heating. Its internal energy is  
 (a) increased by 400 J (b) increased by 200 J  
 (c) increased by 100 J (d) decreased by 200 J
- 26 The internal energy change in a system that has absorbed 2 kcal of heat and done 500 J of work is  
 → CBSE AIPMT 2009  
 (a) 8900 J (b) 6400 J (c) 5400 J (d) 7900 J

- 27 One mole of an ideal gas goes from an initial state  $A$  to final state  $B$  via two processes. It first undergoes isothermal expansion from volume  $V$  to  $3V$  and then its volume is reduced from  $3V$  to  $V$  at constant pressure. The correct  $p$ - $V$  diagram representing the two processes is  
 → CBSE AIPMT 2011



- 28 A particle executes simple harmonic oscillation with an amplitude  $a$ . The period of oscillation is  $T$ . The minimum time taken by the particle to travel half of the amplitude from the equilibrium position is  
 (a)  $\frac{T}{4}$  (b)  $\frac{T}{8}$   
 (c)  $\frac{T}{12}$  (d)  $\frac{T}{2}$

- 29 The mass  $M$  shown in the figure oscillates in simple harmonic motion with amplitude  $A$ . The amplitude of the point  $P$  is



- (a)  $\frac{k_1 A}{k_2}$  (b)  $\frac{k_2 A}{k_1}$   
 (c)  $\frac{k_1 A}{k_1 + k_2}$  (d)  $\frac{k_2 A}{k_1 + k_2}$

- 30 In the given progressive wave equation,  
 $y = 0.5 \sin(10\pi t - 2x) \text{ cm}$   
 What is the maximum velocity of particle?  
 (a)  $5 \text{ ms}^{-1}$  (b)  $5\pi \text{ ms}^{-1}$  (c)  $10 \text{ ms}^{-1}$  (d)  $10.5 \text{ ms}^{-1}$
- 31 Two waves of wavelengths 99 cm and 100 cm both travelling with velocity  $396 \text{ ms}^{-1}$  are made of interfere. The number of beats produced by them per second are  
 (a) 1 (b) 2 (c) 4 (d) 8
- 32 If  $F = 6\pi\eta^a r^b v^c$ , where,  $F$  = viscous force,  $\eta$  = coefficient of viscosity,  $r$  = radius of spherical body,  $v$  = terminal velocity of the body  
 The values of  $a, b$  and  $c$  are  
 (a)  $a = 1, b = 2, c = 1$  (b)  $a = 1, b = 1, c = 1$   
 (c)  $a = 2, b = 1, c = 1$  (d)  $a = 2, b = 1, c = 2$

- 33 A body is moving with velocity 30 m/s towards East. After 10 s its velocity becomes 40 m/s towards North. The average acceleration of body is  
 (a)  $7 \text{ m/s}^2$    (b)  $\sqrt{7} \text{ m/s}^2$    (c)  $5 \text{ m/s}^2$    (d)  $1 \text{ m/s}^2$

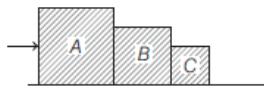
- 34 A body initially at rest is moving with uniform acceleration  $a \text{ m/s}^2$ . Its velocity after  $n$  second is  $v$ . The displacement of the body in last 2 s is

$$\begin{array}{ll} \text{(a)} \frac{2v(n-1)}{n} & \text{(b)} \frac{v(n-1)}{n} \\ \text{(c)} \frac{v(n+1)}{n} & \text{(d)} \frac{2v(2n+1)}{n} \end{array}$$

- 35 A particle is moving such that its position coordinates  $(x, y)$  are  $(2 \text{ m}, 3 \text{ m})$  at time  $t = 0$ ,  $(6 \text{ m}, 7 \text{ m})$  at time  $t = 2 \text{ s}$  and  $(13 \text{ m}, 14 \text{ m})$  at time  $t = 5 \text{ s}$ . Average velocity vector ( $\mathbf{v}_{av}$ ) from  $t = 0$  to  $t = 5 \text{ s}$  is  
 (a)  $\frac{1}{5}(13\hat{i} + 14\hat{j})$    (b)  $\frac{7}{3}(\hat{i} + \hat{j})$    (c)  $2(\hat{i} + \hat{j})$    (d)  $\frac{11}{5}(\hat{i} + \hat{j})$

- 36 A balloon with mass  $m$  is descending down with an acceleration  $a$  (where,  $a < g$ ). How much mass should be removed from it, so that its starts moving up with an acceleration  $a$ ? → CBSE AIPMT 2014  
 (a)  $\frac{2ma}{g+a}$    (b)  $\frac{2ma}{g-a}$    (c)  $\frac{ma}{g+a}$    (d)  $\frac{ma}{g-a}$

- 37 Three blocks A, B and C of masses 4 kg, 2 kg and 1 kg, respectively, are in contact on a frictionless surface as shown. If a force of 14 N is applied on the 4 kg block, then the contact force between A and B is

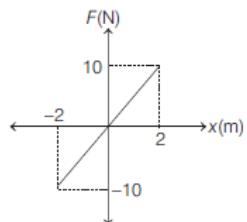


- (a) 6 N   (b) 8 N   (c) 18 N   (d) 2 N

- 38 What will be the maximum speed of a car on a road turn of radius 30 m, if the coefficient of friction between the tyres and the road is 0.4?

(Take,  $g = 9.8 \text{ m/s}^2$ )  
 (a) 10.84 m/s   (b) 9.84 m/s  
 (c) 8.84 m/s   (d) 6.84 m/s

- 39 A force  $F$  acting on a particle varies with the position  $x$  as shown in the figure. The work done by this force in displacing the particle from  $x = -2 \text{ m}$  to  $x = 0 \text{ m}$  is  
 (a) -10 J   (b) +5 J   (c) -20 J   (d) +40 J



- 40 A body of mass 1 kg is thrown upwards with a velocity  $20 \text{ ms}^{-1}$ . It momentarily comes to rest after attaining a height of 18 m. How much energy is lost due to air friction? (Take,  $g = 10 \text{ ms}^{-2}$ ) → CBSE AIPMT 2009

- (a) 20 J   (b) 30 J   (c) 40 J   (d) 10 J

- 41 From a disc of radius  $R$  and mass  $M$ , a circular hole of diameter  $R$ , whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis passing through the centre?→ NEET 2016

$$\begin{array}{ll} \text{(a)} \frac{13MR^2}{32} & \text{(b)} \frac{11MR^2}{32} \\ \text{(c)} \frac{9MR^2}{32} & \text{(d)} \frac{15MR^2}{32} \end{array}$$

- 42 A rod PQ of mass  $M$  and length  $L$  is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in figure. When string is cut, the initial angular acceleration of the rod is  
→ NEET 2013

$$\begin{array}{ll} \text{(a)} \frac{3g}{2L} & \text{(b)} \frac{g}{L} \\ \text{(c)} \frac{2g}{L} & \text{(d)} \frac{2g}{3L} \end{array}$$

- 43 A mass  $m$  is at a distance  $x$  from one end of a uniform rod of length  $l$  and mass  $M$ . The gravitational force on the mass due to the rod is

$$\begin{array}{ll} \text{(a)} \frac{GMm}{(x+l)^2} & \text{(b)} \frac{GMm}{x(l+x)} \\ \text{(c)} \frac{GMm}{x^2} & \text{(d)} \frac{GmM}{\left(\frac{l}{2}+x\right)^2} \end{array}$$

- 44 A copper rod of length  $L$  and radius  $r$  is suspended from the ceiling by one of its ends. What will be elongation of the rod due to its own weight when  $\rho$  and  $Y$  are the density and Young's modulus of the copper, respectively?

$$\begin{array}{ll} \text{(a)} \frac{\rho^2 gl^2}{2Y} & \text{(b)} \frac{\rho gl^2}{2Y} \\ \text{(c)} \frac{\rho^2 g^2 L^2}{2Y} & \text{(d)} \frac{\rho g L}{2Y} \end{array}$$

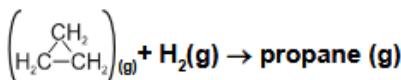
- 45 Two equal drops of water are falling through air with a steady velocity  $v$ . If the drops coalesced, what will be the new velocity?

$$\begin{array}{ll} \text{(a)} (2)^{\frac{1}{3}} v & \text{(b)} (2)^{\frac{3}{2}} v \\ \text{(c)} (2)^{\frac{2}{3}} v & \text{(d)} (2)^{\frac{1}{4}} v \end{array}$$

## SUBJECT: CHEMISTRY (SRB 3, Sunday, 07.12.25)

**Topic: Basic Concepts in Chemistry, Atomic Structure, Periodic Classification, Chemical Bonding, Thermodynamics, Equilibrium, Redox Reactions, Solutions, Electrochemistry, Chemical Kinetics, General Organic Chemistry, Co-ordination compounds, Hydrocarbons, Bio-molecules**

46. Calculate  $\Delta H$  for the reaction-



Given: Bond enthalpies of C–C = 330 kJ/mol, C–H = 410 kJ/mol, H–H = 440 kJ/mol  
 (1) -50 kJ/mol      (2) 50 kJ/mol  
 (3) 360 kJ/mol      (4) -360 kJ/mol

47. Statement I: The value of  $K_H$  increases with increase of temperature and  $K_H$  is function of the nature of the gas.

Statement II: The partial pressure of the gas in vapour phase is proportional to the mole fraction of the gas in the solution.

- (1) If both Statement-I Statement-II are true
- (2) If both Statement-I Statement-II are false
- (3) If Statement-I is true but Statement-II is false.
- (4) If Statement-I is false but Statement-II is true.

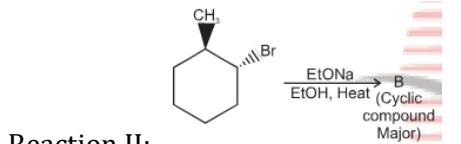
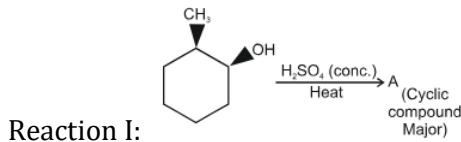
48. Determine the correct order of bond angle?

- (1)  $\text{BF}_3 < \text{BCl}_3 < \text{BBr}_3$
- (2)  $\text{NF}_3 = \text{CCl}_4 = \text{ClO}_4^-$
- (3)  $\text{NH}_3 < \text{PH}_3 < \text{H}_2\text{O} < \text{CH}_4$
- (4)  $\text{SO}_4^{2-} = \text{PO}_4^{3-} = \text{ClO}_4^-$

49. The number of moles of methane required to produce 11g  $\text{CO}_2(\text{g})$  after complete combustion is:

- (1) 0.35      (2) 0.25
- (3) 0.75      (4) 0.5

50. Consider the reactions.



Reaction I and II are elimination reactions.

The correct statement is

- (1) A and B are identical compounds
- (2) A and B are positional isomers
- (3) A and B are functional isomers
- (4) A and B are geometrical isomers

51. Consider the reaction at 300 K



If 2 mole of  $\text{H}_2$  completely react with 2 mole of  $\text{Cl}_2$  to form  $\text{HCl}$ , What is  $\Delta U^\circ$  for this reaction?

- (1) 0      (2) -185 kJ
- (3) 370 Kj      (4) -370 Kj

52. Match the column-I and column-II.

Column I (Species)	Column II (Conjugate base)
a) $\text{HCO}_3^-$	p) $\text{OH}^-$
b) $\text{H}_2\text{O}$	q) $\text{SO}_4^{2-}$
c) $\text{NH}_3$	r) $\text{CO}_3^{2-}$
d) $\text{HSO}_4^-$	s) $\text{NH}_3^-$

- (1) a → s, b → p, c → r, d → q
- (2) a → r, b → p, c → s, d → q
- (3) a → r, b → p, c → q, d → s
- (4) a → r, b → q, c → s, d → p

53. In bohr model of atom:

- (a) the radius of nth orbit is proportional of  $n^2$

- (b) the total energy of the electron in the nth orbit is inversely proportional to n.  
 (c) the angular momentum of the electron in a orbit is an integral multiple of  $h/2\pi$   
 (d) the magnitude of the potential energy of the electron in an orbit is greater than kinetic energy.

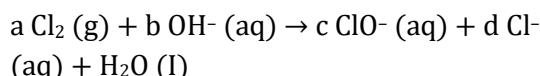
Select correct option:

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

54. Which of the following has the highest degree of ionisation?

- |                           |                              |
|---------------------------|------------------------------|
| (1) 1 M NH <sub>3</sub>   | (2) 0.001 M NH <sub>3</sub>  |
| (3) 0.1 M NH <sub>3</sub> | (4) 0.0001 M NH <sub>3</sub> |

55. Chlorine undergoes disproportionation in alkaline medium as shown below:



The value of a, b, c and d in a balanced redox reaction are respectively:

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

56. For a first order reaction ( $k = 6.93 \text{ s}^{-1}$ ) the time required to reduce the initial concentration of the reactant to its 1/16th value is

- |           |           |
|-----------|-----------|
| (1) 0.4 s | (2) 0.2 s |
| (3) 0.1 s | (4) 0.8 s |

57. Methane cannot be prepared by the following methods

- (I) Decarboxylation
- (II) Kolbe's electrolysis
- (III) Wurtz reaction
- (IV) Hydrolysis of Grignard reagent

The correct combination

- |                  |                   |
|------------------|-------------------|
| (1) I & IV only  | (2) II & III only |
| (3) I & III only | (4) II & IV only  |

58. Which of following statement is incorrect?

- (1) Lithium and magnesium exhibit diagonal relationship  
 (2) Elements of groups 1, 2, 13, 14, 15, 16 and 17 are known as representative elements  
 (3) In 5th period, the subshells 5s, 4f, 4d, 5p would be filled  
 (4) General configuration of f-Block elements is  $(n-2)f^{1-14} (n-1)d^{0-1} ns^2$

59. How many of following statements are correct regarding chromium:

- |   |   |       |       |
|---|---|-------|-------|
| (a) Its electronic configuration is $3d^5 4s^1$               | (b) total spin of chromium = +3 or -3                         |       |       |
| (c) Magnetic moment of chromium = $\sqrt{48}$                 | (d) It has 4 electrons in 3d and two electron in 4s- orbitals |       |       |
| (e) The principal quantum number of its valence electron is 4 | (f) It has 6 electrons in p-subshells                         |       |       |
| (1) 2   | (2) 3   | (3) 4 | (4) 5 |

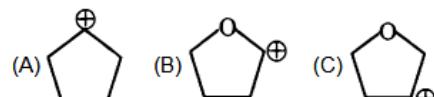
60. AX<sub>2</sub> is a sparingly soluble salt. The solubility product of AX<sub>2</sub> is  $3.2 \times 10^{-11}$ . Find the value of solubility (s) in mol L<sup>-1</sup>?

- |                         |                         |
|-------------------------|-------------------------|
| (1) $2 \times 10^{-8}$  | (2) $2 \times 10^{-4}$  |
| (3) $8 \times 10^{-12}$ | (4) $2 \times 10^{-11}$ |

61. Which of the following is wrong?

- |   |
|---|
| (1) NH <sub>3</sub> < PH <sub>3</sub> < AsH <sub>3</sub> $\Rightarrow$ Acidic character                       |
| (2) Li < Be < B < C $\Rightarrow$ IE <sub>1</sub>   |
| (3) Al <sub>2</sub> O <sub>3</sub> < MgO < Na <sub>2</sub> O < K <sub>2</sub> O $\Rightarrow$ Basic character |
| (4) Li <sup>+</sup> < Na <sup>+</sup> < K <sup>+</sup> < Cs <sup>+</sup> $\Rightarrow$ Ionic radius           |

62. Arrange the following carbocations in decreasing order of stability.



- |               |               |
|---------------|---------------|
| (1) A > C > B | (2) A > B > C |
| (3) C > B > A | (4) B > A > C |

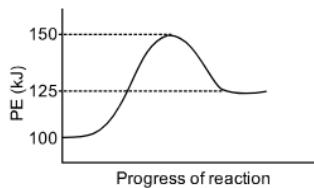
63. In the electrolysis of  $\text{CuCl}_2$  solution (aq) with Cu electrodes, the weight of cathode increased by 3.2 g. In the anode:
- 0.05 mole of  $\text{Cu}^{2+}$  will go into the solution
  - 560 mL of  $\text{O}_2$  will be liberated
  - 112 mL of  $\text{Cl}_2$  will be liberated
  - 3.2 mole of  $\text{Cu}^{2+}$  will go into the solution

64. Statement-I: For the daniell cell,  $\text{Zn}|\text{Zn}+2||\text{Cu}+2|\text{Cu}$  with  $E^\circ_{\text{cell}} = 1.1\text{V}$ , the application of opposite potential greater than 1.1 V results in the flow of electrons from Zn rod to Cu electrode.

Statement-II: During the working of a daniell cell, Zn rod is dissolved at anode and Cu is deposited at cathode.

- Both Statement-I and Statement-II are true
- Both Statement-I and Statement-II are false.
- Statement-I is true but Statement-II is false.
- Statement-I is false but Statement-II is true.

65. Consider the following potential energy diagram. Which of the following is true for the forward reaction?



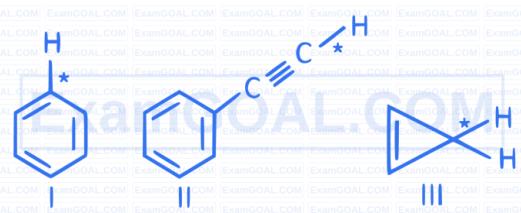
$\Delta H(\text{kJ})$	PE of activated complex (kJ)
(1) -25	50
(2) -25	150
(3) +25	50
(4) +25	150

66. Match the following:

	Column-I		Column-II
a	11.2 litres of $\text{CO}_2$ at STP	(P)	2.0 mole
b	$12.044 \times 10^{23}$ molecule of N	(Q)	0.5 mole
c	36 g of carbon	(R)	1.0 mole
d	18 ml of $\text{H}_2\text{O}$ (l)	(S)	3.0 mole

- (a)-P, (b)-Q, (c)-S, (d)-R
- (a)-Q, (b)-P, (c)-S, (d)-R
- (a)-Q, (b)-P, (c)-R, (d)-S
- (a)-Q, (b)-S, (c)-P, (d)-R

67. Among the given compounds I-III, the correct order of bond dissociation energy of C-H bond marked with \* is:



- III > II > I
- II > III > I
- II > I > III
- I > II > III

68. The following solutions were prepared by dissolving 10 g of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) in 250 ml of water ( $P_1$ ), 10 g of urea ( $\text{CH}_4\text{N}_2\text{O}$ ) in 250 ml of water ( $P_2$ ) and 10 g of sucrose ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) in 250 ml of water ( $P_3$ ). The right option for the decreasing order of osmotic pressure of these solutions is:

- $P_3 > P_1 > P_2$
- $P_2 > P_1 > P_3$
- $P_1 > P_2 > P_3$
- $P_2 > P_3 > P_1$

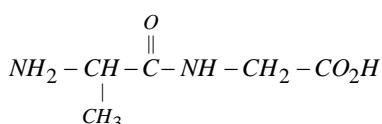
69.  $\alpha$  and  $\beta$  form of glucose are

- At equilibrium
- The anomers
- The cyclic structures
- All of these

70. Which of the following form /s osazone with phenylhydrazine?

- Glucose
- Fructose
- Maltose
- All the three

71.



Identify the amino acid obtained by hydrolysis of the above compound.

- (a) Glycine                    (b) Alanine  
 (c) Both (a) and (b)        (d) None of these

72. I. Pyran is a cyclic organic compound with one oxygen atom and five carbon atom.

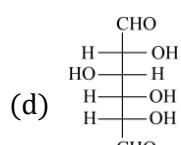
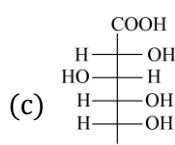
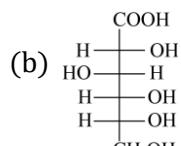
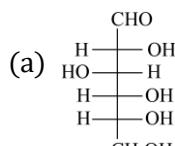
II. The cyclic structure of glucose is correctly represented by Haworth structure.

III. Five membered cyclic structure of glucose is called pyranose structure.

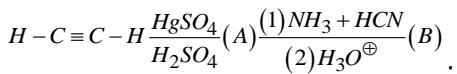
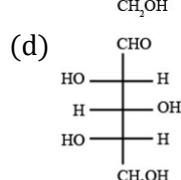
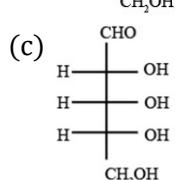
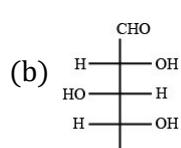
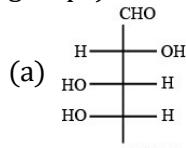
Which of the following statements) is/are true? Choose the correct option.

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

73. What is the product formed when *D*-glucose is treated with *Br*<sub>2</sub> water?



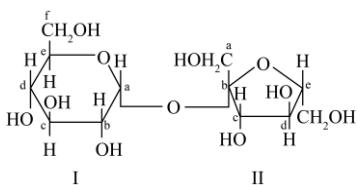
74. Which *L*-sugar on oxidation gives an optically active dibasic acid (2 *COOH* groups)?



75. Product (B) of above reaction is

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

76. Identify the monosaccharide units in the given structure.



- (a) I → α -D-glucose, II → β -D-fructose  
 (b) I → α -D-fructose, II → β -D-glucose  
 (c) I → α -D-fructose, II → β -D-glucose  
 (d) I → α -L-glucose, II → β -L-fructose

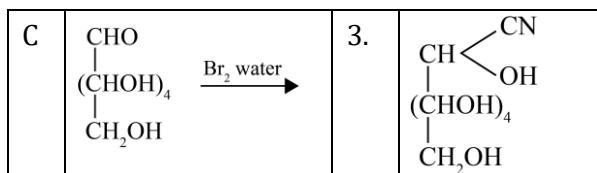
77. Assertion (A): Acetic acid is a carbohydrate.

Reason (R): Acetic acid fits into general formula  $C_2(H_2O)_y$ .

- (a) Both A and R are correct; R is the correct explanation of A  
 (b) Both A and R are correct; R is not the correct explanation of A  
 (c) A is correct; R is incorrect  
 (d) R is correct; A is incorrect

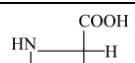
78. Match the following Column I with product given in the Column II.

	Column - I		Column - II
A	$\begin{array}{c} CHO \\   \\ (CHOH)_4 \\   \\ CH_2OH \end{array}$	$\xrightarrow{NH_2OH}$	1. $\begin{array}{c} COOH \\   \\ (CHOH)_4 \\   \\ CH_2OH \end{array}$
B	$\begin{array}{c} CHO \\   \\ (CHOH)_4 \\   \\ CH_2OH \end{array}$	$\xrightarrow{HCN}$	2. $\begin{array}{c} CH=NOH \\   \\ (CHOH)_4 \\   \\ CH_2OH \end{array}$



- (a) A → 1, B → 2, C → 3      (b) A → 1, B → 3, C → 2  
 (c) A → 2, B → 3, C → 1      (d) A → 2, B → 1, C → 3

79. Match the following amino acid in Column I with their characteristic feature of side chain given in the Column II and select the appropriate option from the codes given below.

	Column - I		Column - II
A	Asparagine (Asn, N)	1.	
B	Proline (Pro, P)	2.	$\text{HOOC}-\text{CH}_2-\text{CH}_2-$
C	Glutamic acid (Glu, E)	3.	$\text{HO}-\text{CH}_2-$
D	Serine (Ser, S)	4.	$\text{H}_2\text{N}-\text{COCH}_2-$

- (a) A → 4, B → 1, C → 2, D → 3  
 (b) A → 4, B → 2, C → 1, D → 3  
 (c) A → 4, B → 3, C → 1, D → 2  
 (d) A → 4, B → 1, C → 3, D → 2

80. Match the vitamins given in Column I with their deficiency disease given in column II.

	Column – I		Column – II
A	Vitamin B <sub>12</sub>	1.	Increased blood clotting time
B	Vitamin C	2.	Pernicious anaemia
C	Vitamin D	3.	Increased fragility of RBCs and muscular weakness
D	Vitamin E	4.	Scurvy

E	Vitamin K	5.	Rickets and Osteomalacia
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- (a) A → 1, B → 2, C → 4, D → 3, E → 5
  - (b) A → 2, B → 4, C → 5, D → 3, E → 1
  - (c) A → 2, B → 5, C → 3, D → 4, E → 1
  - (d) A → 1, B → 2, C → 3, D → 4, E → 5

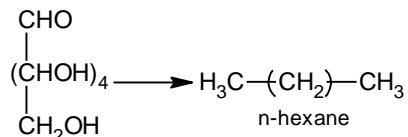
81. Which of the following is not an amino acid?



82. Glucose and mannose are.

- (a) Optical isomers      (b) Anomer  
(c) Epimers                (d) Chain isomers

83. Name the reagent and condition required for the following reaction.






84. Enzymes are made up of

- (a) edible proteins
  - (b) proteins with specific structure
  - (c) nitrogen containing carbohydrates
  - (d) carbohydrates

85. Name the enzyme that catalyses the reaction given below.

$$C_2H_{22}O_{11} \xrightarrow[\text{maltose}]{(?)} 2C_6H_{12}O_6 \quad \text{glucose}$$



86. The enzyme which catalyse the oxidation of one substrate with simultaneous reduction of another substrate are called as...I...enzyme.

The enzyme ends with the name of ...II...Identify. I and II for the above blanks from the options given below.

- |                       |          |
|-----------------------|----------|
| (a) I → reductoxidase | II → ase |
| (b)I → oxidoreductase | II → ase |
| (c)I → oxidoreductase | II → ese |
| (d)I → reductoxidase  | II → ese |

87. Which one of the following metals is present in vitamin  $B_{12}$  ?

- |               |           |
|---------------|-----------|
| (a) Aluminium | (b)Iron   |
| (c)Zinc       | (d)Cobalt |

88. Pyridoxine is also known as

- |                     |                  |
|---------------------|------------------|
| (a) Vitamin $B_2$   | (b)Vitamin $B_6$ |
| (c)Vitamin $B_{12}$ | (d)Vitamin $B_1$ |

89. Which of the following B groups vitamins can be stored in our body?

- |                   |                     |
|-------------------|---------------------|
| (a) Vitamin $B_1$ | (b)Vitamin $B_2$    |
| (c)Vitamin $B_6$  | (d)Vitamin $B_{12}$ |

90. The chemical messengers produced in the ductless glands are.

- |              |               |
|--------------|---------------|
| (a) Vitamins | (b)Lipids     |
| (c)Hormones  | (d)Antibodies |

**91. Proton gradient is broken down due to**

**1) Movement of electrons across the membrane to stroma**

**2) Movement of electrons across the membrane to lumen**

**3) Movement of proton across the membrane to lumen**

**4) Movement of proton across the membrane to stroma**

**92. Which of the following is a simplified equation of photosynthesis?**

**1)  $\text{CO}_2 + 2\text{H}_2\text{O} \xrightarrow{\text{Light energy}} \text{Chlorophyll C}_5\text{H}_{10}\text{O}_4 + \text{H}_2\text{O} + \text{O}_2 \uparrow$**

**2)  $\text{CO}_2 + 2\text{H}_2\text{O} \xrightarrow{\text{Light energy}} \text{Chlorophyll (CH}_2\text{O)}_n + \text{O}_2 \uparrow$**

**3)  $\text{CO}_2 + 2\text{H}_2\text{O} \xrightarrow{\text{Light energy}} \text{Chlorophyll C}_3\text{H}_6\text{O}_3 + \text{CO}_2 + \text{O}_2 \uparrow$**

**4)  $\text{CO}_2 + 2\text{H}_2\text{O} \xrightarrow{\text{Light energy}} \text{Chlorophyll (CH}_2\text{O)}_n + \text{H}_2\text{O} + \text{O}_2 \uparrow$**

**93. The law of limiting factors was proposed with particular reference to photosynthesis. Identify the scientist, who proposed this law?**

**1) Calvin 2) Weismann 3) Emerson 4) Blackman**

**94. The synthesis of one molecule of glucose during Calvin cycle requires**

**1) 12 molecules of ATP and 18 molecules of NADPH<sub>2</sub>**

**2) 6 molecules of ATP and 12 molecules of NADPH<sub>2</sub>**

**3) 18 molecules of ATP and 12 molecules of NADPH<sub>2</sub>**

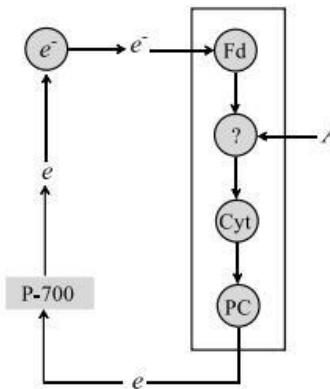
**4) 12 molecules each of ATP and NADPH<sub>2</sub>**

**95. Identify the correct combination of the following substrate enzyme**

substrate	enzyme	Product
I. Phosphoen -ol pyruvate	PEP carboxylase	C <sub>4</sub> acid
II. Malate	Malic enzyme	C <sub>4</sub> acid
III. RuBP	Ribulose 5- phosphate kinase	C <sub>3</sub> acid
IV. Pyruvate	Pyruvate dikinase	C <sub>3</sub> acid

**1) III and IV 2) I and II 3) II and III 4) I and IV**

**96. In the given chart of photophosphorylation. What does 'A' represent?**



**1) PC 2) FRS 3) PQ 4) Cyt -3**

**97. Which one of the following is not true about the light reactions of photosynthesis?**

**1) Light energy provides energy for the photolysis of water through excitation of the reaction centre of PSII**

**2) The flow of electrons from water to NADP in non-cyclic electron transport produces one ATP**

**3) Reactions of the two photosystems are needed for the reduction of NADP**

**4) P680 and P700 are the reaction centres of PS-I and PS-II respectively**

**98. Factors affecting photosynthesis are**

**I. number and size of leaves**

**II. age and orientation of leaves**

**III. amount of chlorophyll**

**IV. amount of O<sub>2</sub> and CO<sub>2</sub> Select the correct option**

**1) I, II and IV      2) II, IV and V**

**3) IV, V and I      4) I, II, III and IV**

99. In an experiment, a leaf was partially covered with black paper, and other one was exposed to light. On testing these leaves for starch, in the presence of sunlight, one may conclude that photosynthesis had occurred in

- 1) Green part of leaves
- 2) Black paper covered part of leaves
- 3) Both (a) and (b)
- 4) None of the above

100. I. It is the characteristic of C4-plants

- II. It is the characteristic of C3-plants
- III. It occurs in chloroplast
- IV. It occurs in day time

V. It occurs in night Select the correct options in relation to photorespiration

Correct option      Incorrect option

- |                |             |
|----------------|-------------|
| 1) I, IV       | II, III, IV |
| 2) II, III, IV | I, V        |
| 3) I, II, III  | IV, V       |
| 4) IV, V       | I, II, III  |

101. In C4-plants, the bundle sheath cells

- 1) Have thin walls to facilitate gaseous exchange
- 2) Have large intercellular spaces
- 3) Are rich in PEP carboxylase
- 4) Have a high density of chloroplasts

102. The following (I-IV) are the main steps of chemosynthetic ATP synthesis in the light reaction. Arrange them in correct order

- I. H<sup>+</sup> concentration gradient established
- II. H<sup>+</sup> diffuses through ATP synthetase
- III. Carriers use energy from electrons to move H<sup>+</sup> across the membrane
- IV. Electrons from PS-II pass along electron transport chain
- V. Light excites electrons in PS-II
- VI. Energy of H<sup>+</sup> flow is used by ATP synthetase to make ATP

- 1) I, II, III, IV, V, VI      2) II, IV, V, III, II, VI

- 3) V, IV, III, I, II, VI      4) V, VI, III, IV, II, I

103. What is true for photosynthesis?

- 1) Carbon dioxide is oxidised and water is reduced
- 2) Carbon dioxide is reduced and water is oxidised
- 3) Both carbon dioxide and water are reduced
- 4) Both carbon dioxide and water are oxidised

104. Which of the following statement is false in case of (C4-plant)?

- 1) CO<sub>2</sub> acceptor is RuBisCo in mesophyll cell
- 2) Carboxylation occurs in mesophyll cells
- 3) Leaves have two cell types
- 4) Mesophyll cells lack Rubisco

105. What is the advantage of light reactions producing ATP and NADPH<sub>2</sub> on stromal side of thylakoid membrane?

- 1) Calvin cycle consumes ATP and NADPH<sub>2</sub> from stroma
- 2) Light reaction occurs in stroma
- 3) Dark reaction occurs in grana need ATP + NADPH<sub>2</sub>
- 4) CO<sub>2</sub> is produced in stroma

106. Respiration is defined as –

- 1) Formation of C – C bonds of complex compound
- 2) Breaking of C – C bonds of complex compound
- 3) Breaking of C – N bonds of complex compound
- 4) All of the above

107. The C – C bond of complex compound is broken by which process in respiration?

- 1) Oxidation      2) Reduction
- 3) Hydrogenation      4) None of the above

108. Which among the following is wrong?

- i) Only carbohydrates are oxidised to release energy in the process of respiration.
- ii) Energy produced in respiration is not released in a single step.
- iii) ATP can be broken down, as and when energy needs to be utilised.

- 1) Only ii    2) Only iii    3) Only i    4) None of the above

**109. Compounds that are oxidised during the process of respiration is called?**

- 1) Respiratory index      2) Reductory substrate  
3) Respiratory quotient    4) Respiratory substrate

**110. What are the byproducts of Respiration process?**

- 1) Oxygen                  2) Water  
3) Carbon dioxide        4) Both 2 and 3

**111. Which among the following is wrong?**

- 1) Roots, Leaves and Stem respire a lot lower than animal do  
2) For plants to respire, availability of O<sub>2</sub> is a problem as O<sub>2</sub> is not released within the cell during photosynthesis  
3) There is very little transport of gases from one plant part to another  
4) None of the above

**112. Sucrose is converted to (i) and (ii) using enzyme (iii)**

	<b>(i)</b>	<b>(ii)</b>	<b>(iii)</b>
A)	Glucose	Glucose	Hexokinase
B)	Glucose	Fructose	Hexokinase
C)	Glucose	Glucose	Invertase
D)	Glucose	Fructose	Invertase

**113. ATP is utilised in which steps of glycolysis.**

- i) Conversion of BPGA to PGA  
ii) Conversion of glucose into glucose 6– phosphate  
iii) Conversion fructose 6 – phosphate to fructose 1, 6 – bisphosphate  
iv) Conversion of PEP to pyruvate  
1) Only i                    2) Only iii  
3) Both ii and iii        4) Only ii, iii, iv

**114. How many statements are correct about fermentation?**

- i) Very low amount of energy is released, < 7% of energy in glucose is released in fermentation

ii) In animal cells, when oxygen is inadequate acetic acid is formed during respiration

iii) It is dangerous process as it leads to acid and alcohol formation.

- 1) 0    2) 1    3) 2    4) 3

**115. How many total NADH<sub>2</sub> are produced from pyruvate to completion of TCA cycle?**

- 1) 2    2) 3    3) 4    4) 5

**116. The aerobic respiration yields**

- (1) 8NADH<sub>2</sub>, 2FADH<sub>2</sub>, 2ATP  
(2) 10NADH<sub>2</sub>, 2FADH<sub>2</sub>, 38ATP  
(3) 12NADH<sub>2</sub>, 30ATP, H<sub>2</sub>O  
(4) 10NADH<sub>2</sub>, 2FADH<sub>2</sub>, 2GTP, 2ATP

**117. Pyruvate (pyruvic acid) dehydrogenase is used in converting**

- (1) Pyruvate to glucose    (2) Glucose to pyruvate  
(3) Pyruvic acid to lactic acid  
(4) Pyruvate (pyruvic acid) to acetyl-CoA

**118. The number of molecules of pyruvic acid formed from one molecule of glucose at the end of glycolysis is**

- (1) 1    (2) 2    (3) 3    (4) 4

**119. The common phase between aerobic and anaerobic respiration is called**

- (1) Tricarboxylic acid cycle  
(2) Oxidative phosphorylation  
(3) Embden, Meyerhoff, Parnas cycle  
(4) Kreb's cycle

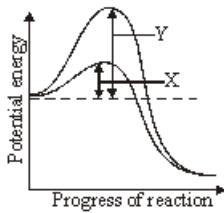
**120. Kreb's cycle is termed as the aerobic phase of respiration because**

- (1) It consumes oxygen  
(2) Oxygen acts as a catalyst  
(3) Aerobic conditions are essential for the continued operation of electron transport system  
(4) All the above

**121. The polysaccharides made up of glucose monomers are**

- (1) sucrose, lactose, maltose  
(2) chitin, glycogen, starch  
(3) starch, glycogen, cellulose  
(4) starch, inulin, peptidoglycan.

**122. What is denoted by X and Y in the given graph?**



- (1) X = Activation energy without enzyme  
Y = Activation energy with enzyme  
(2) X = Activation energy with enzyme  
Y = Activation energy without enzyme  
(3) X = Substrate concentration with enzyme  
Y = Substrate concentration without enzyme  
(4) X = Substrate concentration without enzyme  
Y = Substrate concentration with enzyme

**123. What is / are difference between inorganic catalyst and enzyme catalyst.**

- 1) inorganic catalysts work efficiently at low temperature but enzyme of only thermophilic organism work efficiently at low temperature
- 2) Inorganic catalyst work efficiently at high temperature but enzyme get damaged at high temperature except of microbes that are live in sulphur springs
- 3) Inorganic catalyst are not efficient at high temperature but enzymes of all living organism work efficiently at high temperature.
- 4) None of these

**124. Match Column-I with Column-II and select the correct option from the codes given below.**

Column-I	Column-II
A. Cotton fibre	(i) Starch
B. Exoskeleton of cockroach	(ii) Glycogen
C. Liver	(iii) Chitin
D. Peeled potato	(iv) Inulin
E. Roots of <i>Dahlia</i>	(v) Cellulose

- (1) A-(v), B-(iii), C-(ii), D-(i), E-(iv)
- (2) A-(v), B-(iii), C-(i), D-(iv), E-(ii)
- (3) A-(i), B-(ii), C-(iii), D-(v), E-(iv)
- (4) A-(iii), B-(ii), C-(v), D-(iv), E-(i)

**125. What would be amount of DNA (C) and number of chromosome (N) in animal cell just after completion of S phase if the initial amount is 2C and 2N?**

- A) 2C and 2N respectively
- B) 4C and 4N respectively
- C) 4C and 2N respectively
- D) 2C and 4N respectively

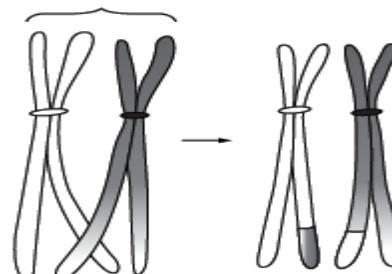
**126. Assertion: The complex formed by a pair of synapsed homologous chromosome is called a**

bivalent or a tetrad.

**Reason:** The first two stages of prophase I are relatively short lived when compared to the next stage that is pachytene.

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
  - (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
  - (c) If the assertion is true but the reason is false.
  - (d) If both the assertion and reason are false.
- 127. Assertion:** In oocytes of some vertebrates, the diplotene can last for months or years.
- Reason:** The final stage of meiotic prophase I is diakinesis.
- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
  - (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
  - (c) If the assertion is true but the reason is false.
  - (d) If both the assertion and reason are false.

**128. Given below is the representation of a certain event at a particular stage of a type of cell division. What is this stage?**



- (a) Prophase I during meiosis
- (b) Prophase II during meiosis
- (c) Prophase of mitosis
- (d) Both prophase and metaphase of mitosis

**129. Assertion:** In some species of Chlamydomonas, the fusion of gamete is termed as anisogamous.

**Reason:** Because gametes which undergo fusion in these species are of dissimilar in size.

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the

**assertion.**

(c) If the assertion is true but the reason is false.

(d) If both the assertion and reason are false.

(a) Cyanobacteria are also called blue-green algae.

(b) Golden algae are also called desmids.

(c) Eubacteria are also called false bacteria.

(d) Phycomycetes are also called algal fungi.

**130. In gymnosperms, the male and female gametophyte**

- I. Do not have independent free living existence.
  - II. Remain within the sporangia retained on parent sporophyte.
  - III. May be born on same or different tree.
  - IV. Perform meiosis to produce gametes.
- (a) I and II      (b) II and III  
(c) III and IV    (d) All

**131. Sex organs in pteridophytes are formed on the**

- (a) Multicellular well-developed sporophyte.
- (b) Multicellular main gametophyte phase of the plant.
- (c) Photosynthetic, free living gametophyte.
- (d) Parasite, gametophyte dependent on sporophyte.

**132. Assertion: Fresh water protozoan possess contractile vacuoles.**

**Reason:** The main function of the vacuole is contraction during digestion.

- (a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- (b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- (c) If the assertion is true but the reason is false.
- (d) If both the assertion and reason are false.

**133. Choose the wrong statement:**

- (a) Neurospora is used in the study of biochemical genetics
- (b) Morels and Buffles are poisonous mushrooms
- (c) Yeast is unicellular and useful in fermentation
- (d) Penicillium is multicellular and produces antibiotics

**134. Which of the following statements is wrong for viroids?**

- (a) They lack a protein coat
- (b) They causes infections
- (c) They are smaller than viruses
- (d) Their RNA is of high molecular weight

**135. Which of the following statements is wrong?**

## ZOOLOGY

DATE: 07/12/2025

### (Human rep., Rep., health., Principles of inheritance., Human health and disease, Cockroach, Frog, Neural control and coordination)

136. Menstruation is triggered by a sudden decline in the amount of hormone secreted by corpus luteum. Identify the hormone.

- (1) Luteinizing hormone
- (2) Follicle stimulating hormone
- (3) Progesterone
- (4) Estrogen

137. Which of the following indicates pregnancy?

- (1) Lack of menstruation
- (2) Occurrence of menstrual flow
- (3) When released ovum is not fertilized
- (4) When Graafian follicle matures and endometrium regenerates through proliferation

138. Two types of cells present in the lining of seminiferous tubules are \_\_\_\_\_ and \_\_\_\_\_.

- (1) Leydig cells, Sertoli cells.
- (2) Male germ cells, Sertoli cells.
- (3) Spermatogonium, spermatids.
- (4) Primary oocyte, Leydig cells.

139. By the end of how many weeks, major organ system are formed during the embryonic development?

- (1) 4 weeks
- (2) 8 weeks
- (3) 12 weeks
- (4) 24 weeks

140. What happens during the follicular phase of menstrual cycle?

- (1) Proliferation of endometrium
- (2) Reduction in blood supply to endometrium
- (3) Regression of endometrium
- (4) No effect on endometrium

141. Blastomeres are daughter cells formed in the process of  
(1) cleavage, when zygote undergoes mitotic division.  
(2) fertilization, when sperm enters in the cytoplasm of ovum.  
(3) implantation, when blastocysts attached to the uterine endometrium.  
(4) gametogenesis, when male and female gametes are produced by testis and ovary respectively

142. Which could be used as an emergency contraceptives to avoid possible pregnancy due to rape or casual unprotected intercourse?

- (1) Implants
- (2) Condom
- (3) IUD's
- (4) Both (1) and (3)

143. Cu ions released from the copper releasing IUDs to:

- A. Suppress sperm motility
  - B. Make uterus unsuitable for implantation
  - C. Suppress fertilizing capacity of sperms
  - D. Make cervix hostile to sperms
- (1) A and B
  - (2) B and D
  - (3) A and C
  - (4) A, C and D

144. The contraceptive method with almost no side effects is

- (1) Periodic abstinence
- (2) Implants
- (3) IUD's
- (4) Pills

145. Given below are two statements: One labelled as Assertion A and the other labelled as Reason R:

Assertion (A): Sickle-cell anaemia is caused by the substitution of Glutamic acid by Valine at the sixth position of the beta globin chain of the haemoglobin molecule.

Reason (R): It results due to the single base substitution at the sixth codon of the beta globin gene from GUG to GAG.

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

- (1) Both A and R are true, and R is the correct explanation of A.
- (2) Both A and R are true, but R is not the correct explanation of A.
- (3) A is true, but R is false.
- (4) A is false, but R is true.

146. Henking's "X body" was observed in:

- (1) All sperm cells
- (2) 50% of sperm cells
- (3) All egg cells
- (4) 50% of egg cells

147. Chromosomal aberrations are often observed in:

- (1) Normal cells
- (2) Cancer cells
- (3) Bacterial cells
- (4) Viral cells

148. Match the disorder with its mode of inheritance:

	Disorders		Modes of Inheritance

i	Haemophilia	A	Autosomal Recessive
ii	Myotonic dystrophy	B	Autosomal Dominant
iii	Sickle Cell Anaemia	C	Sex-linked recessive
iv	Colour Blindness		
v	PKU		
vi	Thalassemia		

- (1) A- iii, v, vi; B-ii, C- i, iv
  - (2) A- v, vi; B- ii; C- i, iii, iv
  - (3) A- v, vi; B- ii, iv; C- i, iii
  - (4) A- iii, v; B- ii, iii; C- i, iv

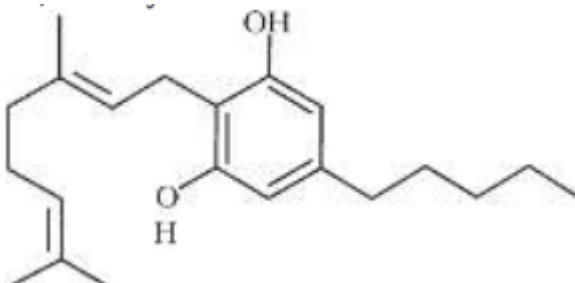
149. Which of the following are commonly observed in individuals with Down Syndrome?



150. Pleiotropy refers to a situation where:

- (1) Multiple genes control a single phenotype.
  - (2) A single gene influences multiple phenotype.
  - (3) Two or more genes are located on the same chromosome.
  - (4) Genes at different loci interact to produce a novel phenotype

151. Identify the molecule shown below and select the right option:



- (1) Morphine (2) Cocaine (3) Cannabinoid (4) LSD

152. Which of the following disease is completely curable if detected early and treated properly?

- (1) AIDS                          (2) Hepatitis-B  
(3) Genital herpes                (4) Gonorrhoea

153. Some times, due to genetic and other unknown reasons, the body attacks self cells, this results in damage to the body's own cells.

- damage to the body this is called as:-  
(1) Anaphylactic shock (2) Autoimmune disease  
(3) AIDS (4) Cancer

154. Which of the following statement is not correct about typhoid



155) The most abundant antibody produced against allergens is :-

- (1) IgE    (2) IgA    (3) IgG    (4) IgM

156) The given barrier belongs to the same category to which tears from eyes belongs?

- (1) Skin (2) Mucosa (3) Plasma cells (4) Saliva in mouth

157) Which one of the following options gives the correct categorisation of six drugs according to the plant from which they are obtained?

	Erythroxylum coca	Cannabis sativa	Papaver somniferum
1	Cocaine	Heroin, morphine	Morphine, Ganja
2	Cocaine	Hashish, charas, heroin	Hashish, charas, ganja
3	Cocaine	Hashish, charas, ganja	Heroin, morphine
4	Heroin	Cocaine, morphine, ganja	Charas, Hashish

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

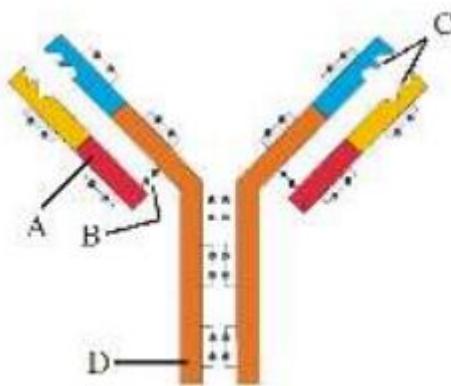
158) Rheumatoid Arthritis is:-

- (1) Bone Cancer      (2) Auto-immune disease  
(3) Immuno deficiency disease (4) Allergy

159) Malignant malaria is caused by :

- (1) Plasmodium falciparum (2) Plasmodium vivax  
(3) Plasmodium malaria (4) None of these

160) Identify (A), (B), (C), (D).



- (1) (A) Heavy chain (C) Epitope (B) Disulphide bond (D) Light chain  
 (2) (A) Light chain (C) Antigen binding site (B) Disulphide bond (D) Heavy chain  
 (3) (A) Light chain (C) Antigen binding site (B) Heavy chain (D) Disulphite bond  
 (4) (A) Light chain (C) Heavy chain (B) Disulphite bond (D) Epitope

- 161) How many statements given below are the examples of 'Naturally Acquired passive immunity'?  
 (a) Interferons which protects non-infected cells from further viral infection  
 (b) The foetus receives some antibodies from their mothers through placenta during pregnancy  
 (c) Colostrum secreted by mother during the initial days of lactation has abundant IgA antibodies to protect the infants  
 (d) ATS (Anti-tetanus serum) provides temporary protection in case of injuries and burns  
 (1) one     (2) two     (3) three     (4) four

- 162) Cancer cells do not exhibit the property of:-  
 (1) Generating tumour  
 (2) Metastasis  
 (3) Contact inhibition  
 (4) Less number of mitochondria

- 163) Nicotine stimulates adrenal gland to release ..... and .....  
 (1) Adrenaline and acetyl choline  
 (2) Adrenaline and Dopamine  
 (3) Acetyl choline and Dopamine  
 (4) Adrenaline and nor adrenaline

- 164) Which drug principally interferes transport of dopamine?  
 (1) Morphine (2) Cocaine (3) Heroin (4) LSD

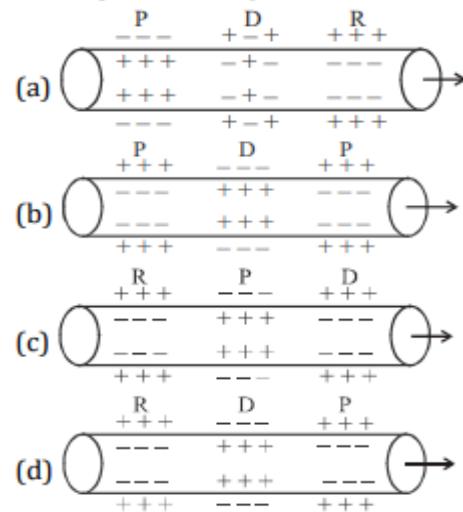
- 165) How many of the following types of Cancer are associated with smoking?

(Lung Cancer, Urinary bladder, Throat, Prostate, Skin

Cancer, Liver Cancer)

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

- 166) Find out the correct labelling in following diagrammatic representation:- (R = Repolarisation, P = Polarisation, D = Depolarisation)



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

- 167) Find out the correct match:-

	<b>Column I</b>		<b>Column II</b>
A	Dendron	i	Protein synthesis
B	Nissl's granule	ii	Saltatory conduction
C	Neurofibril	iii	Afferent part
D	Myelinated Axon	iv	Efferent part
E	Nerve fibre	v	Helps in internal conduction

- (1) A-iii, B-i, C-ii, D-iv, E-v  
 (2) A-iv, B-i, C-ii, D-iii, E-v  
 (3) A-iv, B-v, C-i, D-ii, E-iii  
 (4) A-iii, B-i, C-v, D-ii, E-iv

- 168) Transmission of nerve impulse or action potential is not possible in those neurons which are:-

- (1) Discontinuous myelinated with node of Ranvier.  
 (2) Continuous myelinated without node of ranvier.  
 (3) Non-myelinated axon  
 (4) Transmission is possible in myelinated and not myelinated neuron both

- 169) Statement I: The neural system provides an organised network of point to point connections for a quick coordination.

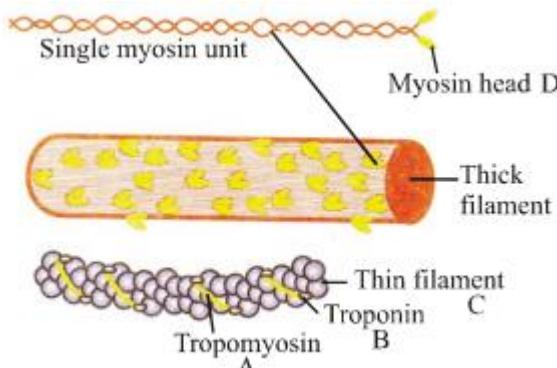
Statement II: The cell body contains cytoplasm with typical cell organelles and certain granular bodies called Nissl's granules.

Statement III: Dendrites transmit impulses away from the cell body.

Statement IV: Transmission of an impulse across electric synapses is very similar to impulse conduction along a single axon.

- (1) Only two      (2) Only three
- (3) Only one      (4) All are correct

170) In following diagram which protein functions as enzyme?



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

171) Find out incorrect statement:

- (1) All locomotions are movement, but all movements are not locomotions
- (2) Red muscle fibres having more mitochondria and myoglobin
- (3) Skeletal muscles are voluntary and striated
- (4) Cardiac muscles are unstriated, branched and involuntary.

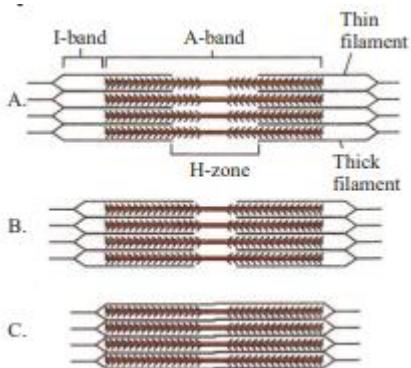
172) In the resting muscle fibre, tropomyosin covers:

- (1) Ca-binding sites on troponin
- (2) Actin binding sites on myosin
- (3) Myosin binding sites on actin
- (4) Ca-binding sites on actin

173) Store house of calcium in muscle is?

- (1) Sarcomere      (2) Sarcosome
- (3) Sarcoplasmic reticulum (4) Lysosome

174) In following diagram which is showing complete contraction:-



- (1) A      (2) B      (3) C      (4) All of these

175) Cockroach has ..... kind of mouth parts

- (1) Lapping and sponging
- (2) Chewing and biting type
- (3) Piercing and sucking type
- (4) Chewing and sucking

176) Find out correct statements about cockroach-

- (A) Anal cerci present both male and female
- (B) Excretory organ are nephridia
- (C) Nocturnal, Cursorial animal
- (D) 3 Pair legs, 3 pair wings

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

177) Assertion: Sperm glue together and form spermatophores in vas deferens in cockroach.

Reason: Sperm stores in vas deferens in cockroach.

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

178) Select the incorrect statement w.r.t. Rana tigrina-

- (1) The urinary bladder is present ventral to the rectum
- (2) The medulla oblongata passes through the foramen magnum and continues into spinal cord
- (3) Hepatic portal system is absent but renal portal system is present
- (4) Vasa efferentia are 10–12 in number

179) During aestivation and hibernation gaseous exchange takes place by-

- (1) Lungs      (2) Skin
- (3) Gills      (4) Buccopharyngeal cavity

180) Which is a correct statement w.r.t. frog-

- (1) Sinus venosus is present on dorsal surface of heart
- (2) Conus arteriosus is present on dorsal surface of heart
- (3) 12 pairs of spinal nerves are present in frog
- (4) Frogs heart are generally neurogenic.