

Test - I (Objective)

Physics : **Electric Charges & Field, Electrostatic Potential and Capacitance:** Introduction, electrostatic potential, potential due to a point charge, potential due to an electric dipole, potential due to a system of charges, Equipotential surfaces, Calculating field from potential, Potential energy of a system of charges, Potential energy in an external field

Chemistry : The Solid State, Solutions

Botany : Reproduction in Organisms, Sexual Reproduction in Flowering Plants

Zoology : Reproduction in Organisms, Human Reproduction

Instructions :

- (i) There are two sections in each subject, i.e. Section-A & Section-B. You have to attempt all 35 questions from Section-A & only 10 questions from Section-B out of 15.
- (ii) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score. Unanswered / unattempted questions will be given no marks.
- (iii) Use blue/black ballpoint pen only to darken the appropriate circle.
- (iv) Mark should be dark and completely fill the circle.
- (v) Dark only one circle for each entry.
- (vi) Dark the circle in the space provided only.
- (vii) Rough work must not be done on the Answer sheet and do not use white-fluid or any other rubbing material on the Answer sheet.

PHYSICS**Choose the correct answer :****SECTION-A**

1. The dimensional formula of volumetric charge density is
 - (1) $[M^0L^{-2}AT]$
 - (2) $[M^0L^{-1}AT]$
 - (3) $[M^0L^{-3}AT]$
 - (4) $[M^{-1}L^{-3}AT]$

2. Select the incorrect statement among the following
 - (1) Charge cannot exist without mass
 - (2) Charging process involves transfer of electrons
 - (3) Coulombian force forms an action-reaction pair
 - (4) When a body is charged, its mass always decreases

3. Two parallel thin metal sheets have surface charge densities σ and $-\sigma$. The electric field between these sheets is

(1) $\frac{\sigma}{4\epsilon_0}$ (2) $\frac{\sigma}{\epsilon_0}$
 (3) Zero (4) $\frac{\sigma}{2\epsilon_0}$

4. Two point charges $2\text{ }\mu\text{C}$ and $-3\text{ }\mu\text{C}$ are separated by a distance 3 m. The magnitude and nature of the force between the two charges is

- (1) $6 \times 10^{-3}\text{ N}$, repulsive
 (2) $6 \times 10^{-3}\text{ N}$, attractive
 (3) $18 \times 10^{-3}\text{ N}$, repulsive
 (4) $18 \times 10^{-3}\text{ N}$, attractive

5. Two charged particles having charge $4\text{ }\mu\text{C}$ and mass $8 \times 10^{-3}\text{ kg}$ each are joined by an insulating string of length 3 m and the system is kept on a smooth horizontal table. If suddenly string is cut then the acceleration of each particle is

- (1) 2 m/s^2 (2) 4 m/s^2
 (3) 6 m/s^2 (4) 8 m/s^2

6. The electric force experienced by a point charge of $1\text{ }\mu\text{C}$ is $5 \times 10^{-3}\text{ N}$. The magnitude of the electric field at that point due to the source charge is

- (1) $5 \times 10^3\text{ N/C}$
 (2) $25 \times 10^3\text{ N/C}$
 (3) $5 \times 10^{-3}\text{ N/C}$
 (4) $2.5 \times 10^3\text{ N/C}$

7. Three point charges each of charge q are fixed at three corner of an equilateral triangle of side a . The electric field intensity at the centroid is

(1) $\frac{3q}{4\pi\epsilon_0 a^2}$ (2) $\frac{q}{4\pi\epsilon_0 a^2}$
 (3) $\frac{q}{12\pi\epsilon_0 a^2}$ (4) Zero

8. A particle of mass m and charge q is revolving around a fixed charge $-Q$ in a circular path of radius R . The frequency of revolution is

(1) $\frac{1}{4\pi} \sqrt{\frac{qQ}{\pi\epsilon_0 Rm}}$ (2) $\frac{1}{4\pi R} \sqrt{\frac{qQ}{\pi\epsilon_0 Rm}}$
 (3) $\frac{1}{2\pi R} \sqrt{\frac{qQ}{\pi\epsilon_0 Rm}}$ (4) $\frac{1}{2\pi} \sqrt{\frac{qQ}{\pi\epsilon_0 Rm}}$

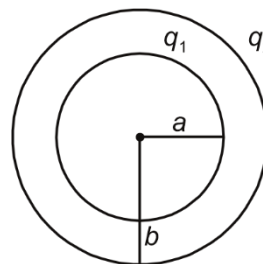
9. An infinite number of charges, each equal to $2\text{ }\mu\text{C}$ are placed along y -axis at $y = 1\text{ m}$, 2 m , 4 m , 8 m , The electric field intensity at the origin is

- (1) $2.4 \times 10^4\text{ N/C}$ (2) $2.4 \times 10^{-3}\text{ N/C}$
 (3) $1.2 \times 10^3\text{ N/C}$ (4) $0.57 \times 10^{-3}\text{ N/C}$

10. An electric dipole is placed in uniform electric field E such that dipole moment P makes an angle 30° with E . The force and torque acting on the dipole are respectively

- (1) 0, PE (2) 0, 0
 (3) 0, $\frac{PE}{2}$ (4) $\frac{PE}{2}$, $\frac{PE}{2}$

11. Two conducting shells have radii a and b charged to q_1 and q_2 respectively as shown in figure. The potential at the surface of smaller shell is



- (1) $\frac{q_1}{4\pi\epsilon_0 a}$ (2) $\frac{q_2}{4\pi\epsilon_0 b}$
 (3) $\frac{q_1}{4\pi\epsilon_0 a} + \frac{q_2}{4\pi\epsilon_0 b}$ (4) $\frac{q_1 + q_2}{4\pi\epsilon_0 a}$

12. If a proton is accelerated from rest with the help of potential difference 100 volts, then its final kinetic energy will be

- (1) 50 eV (2) 200 eV
 (3) 100 eV (4) 400 eV

13. A long thin rod with a charge of λ per unit length passes through an imaginary cube of edge l . The maximum flux of electric field possible through cube will be

- (1) $\frac{6\lambda l}{\epsilon_0}$ (2) $\frac{\lambda l}{\epsilon_0}$
 (3) $\frac{\sqrt{2}\lambda l}{\epsilon_0}$ (4) $\frac{\sqrt{3}\lambda l}{\epsilon_0}$

14. Potential in the x - y plane is given as $V = -10(x^2 + y)$ volts. The electric field at the point (1 m, 1 m) will be

- (1) $10\sqrt{5}\text{ V/m}$ (2) $10\sqrt{3}\text{ V/m}$
 (3) 20 V/m (4) 10 V/m

15. If a point charge q is placed at the centre of a cube, then the flux linked with each face of the cube is

(1) $\frac{q}{\epsilon_0}$ (2) $\frac{q}{6\epsilon_0}$
 (3) $\frac{q}{3\epsilon_0}$ (4) $\frac{6q}{\epsilon_0}$

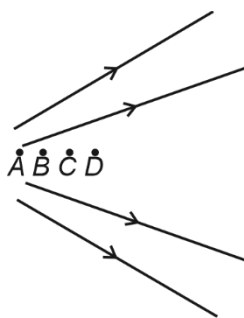
16. Work done by electric field while a charge moves on an equipotential surface is

- (1) Negative
 (2) Zero
 (3) Positive
 (4) May be positive or negative

17. A hollow metallic sphere of radius R is uniformly charged with total charge q . The electric potential at the centre of sphere is

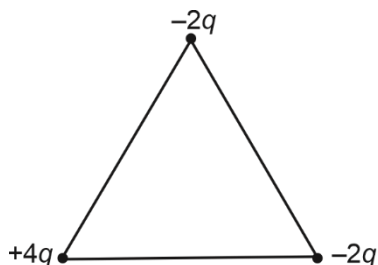
(1) $\frac{q}{2 \times 4\pi\epsilon_0 R}$ (2) Zero
 (3) $\frac{q}{4\pi\epsilon_0 R}$ (4) $\frac{3}{2} \times \frac{q}{4\pi\epsilon_0 R}$

18. Which of the following is true for the figure showing electric lines of force? (E is electric field)



- (1) $E_A > E_B > E_C > E_D$ (2) $E_A = E_B = E_C = E_D$
 (3) $E_D > E_B > E_C > E_A$ (4) $E_A > E_D > E_B > E_C$

19. Three charges are arranged on the vertices of an equilateral triangle of side a as shown in figure. The dipole moment of the combination is



(1) $\sqrt{3}qa$ (2) $2\sqrt{3}qa$
 (3) qa (4) $2qa$

20. An electric dipole of dipole moment 2×10^{-8} C m is placed in an uniform external electric field of 2×10^5 N/C. The maximum torque on the dipole is

(1) 1×10^{-8} N m (2) 2×10^{-3} N m
 (3) 1×10^5 N m (4) 4×10^{-3} N m

21. A spherical drop of mercury having an electric potential of 4 V is obtained as a result of merging 64 identical spherical droplets. The electric potential of each of the original small droplets is

(1) 1 V (2) 0.1 V
 (3) 0.125 V (4) 0.25 V

22. The electric potential at a distance of 5 m from the short dipole of dipole moment 4×10^{-12} C m on the equatorial line is

(1) Zero (2) 4 mV
 (3) 50 mV (4) 40 mV

23. A charge q is placed at the centre of the line joining two equal charges Q . The system of the three charges will be in equilibrium, if Q is equal to

(1) $-q$ (2) $-2q$
 (3) $-\frac{q}{2}$ (4) $-4q$

24. The electric field in a region is given by $E = (3\hat{i} + 4\hat{j})$ N/C. The flux of the field through a square of area 0.1 m^2 placed parallel to x - z plane

(1) $0.3 \text{ N m}^2/\text{C}$ (2) $0.5 \text{ N m}^2/\text{C}$
 (3) $0.4 \text{ N m}^2/\text{C}$ (4) Zero

25. Which of the following is correct about coulomb force?

- (1) Coulomb force is weakest force in nature
 (2) Coulomb force is a short range force
 (3) Coulomb force forms action-reaction pair
 (4) Coulomb forces are always attractive in nature

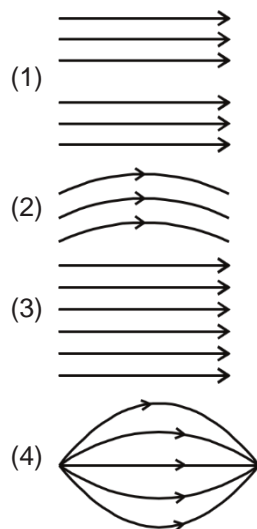
26. There are two charges $+1 \mu\text{C}$ and $-7 \mu\text{C}$ kept in isolated space. The ratio of magnitude of force acting on them will be

(1) 1 : 7 (2) 2 : 3
 (3) 1 : 49 (4) 1 : 1

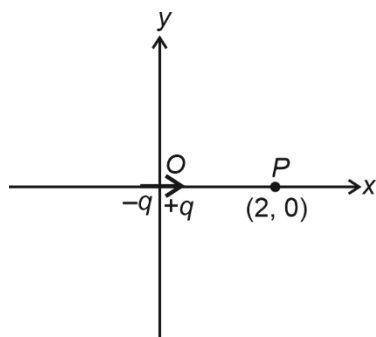
27. The total charge on 9.1 kg of electron is

- (1) $-1.6 \times 10^{-19} \text{ C}$
- (2) $-1.6 \times 10^{12} \text{ C}$
- (3) $-1.6 \times 10^{-12} \text{ C}$
- (4) $-1.6 \times 10^{19} \text{ C}$

28. Which of the following represent uniform electric field?



29. A short electric dipole is placed at the origin as shown in figure. The direction of electric field at $P(2, 0)$ due to this dipole is



- (1) Along +ve x-axis
- (2) Along -ve x-axis
- (3) Along +ve y-axis
- (4) Along -ve y-axis

30. A charge Q is distributed on two bodies in such a way that they have a maximum electrostatic force between them when placed at a particular separation. The ratio of charges on two bodies is

- (1) 1 : 2
- (2) 1 : 4
- (3) 1 : 8
- (4) 1 : 1

31. A body has $-48 \mu\text{C}$ of charge. Number of excess electrons in it will be

- (1) 5×10^{14}
- (2) 4.8×10^{-6}
- (3) 3×10^{14}
- (4) 8×10^{-5}

32. If an electron is placed in external uniform electric field such that it experiences an electric force equal in magnitude and opposite to its own weight then the magnitude of field is ($m \rightarrow$ mass of electron and $e \rightarrow$ magnitude of charge on electron)

- (1) $\frac{eg}{m}$
- (2) $\frac{mg}{e}$
- (3) $\frac{e}{mg}$
- (4) $\frac{m}{eg}$

33. Two charged conducting spheres of radii R_1 and R_2 have equal surface charge density. The ratio of their electric field on their respective surface is

- (1) 1 : 1
- (2) $R_1 : R_2$
- (3) $R_1^2 : R_2^2$
- (4) $R_2 : R_1$

34. The electric field created by a short electric dipole varies with distance r from the dipole as

- (1) r^{-1}
- (2) r^{-2}
- (3) r^3
- (4) r^{-3}

35. Two positive point charges of $12 \mu\text{C}$ and $4 \mu\text{C}$ are 40 cm apart. The work done in bringing them 20 cm closer is

- (1) 1.08 J
- (2) 2.58 J
- (3) 3.16 J
- (4) 2.04 J

SECTION-B

36. The electrostatic potential energy associated with two electrons separated by a distance of 2.56 \AA is

- (1) $1.6 \times 10^{-19} \text{ J}$
- (2) 3.52 eV
- (3) 5.62 eV
- (4) $7 \times 10^{-19} \text{ J}$

37. Earth can be considered as a

- (1) Insulator
- (2) Conductor
- (3) Semiconductor
- (4) Superconductor

38. Which of the following is correct relation between torque acting on a dipole kept in uniform electric field? (Symbols have their usual meanings)

- (1) $\vec{\tau} = \vec{E} \times \vec{P}$
- (2) $\vec{P} = \vec{\tau} \times \vec{E}$
- (3) $\vec{P} = \vec{E} \times \vec{\tau}$
- (4) $\vec{\tau} = \vec{P} \times \vec{E}$

39. The S.I. unit of $\frac{q}{\epsilon_0}$ is (where q is charge and ϵ_0 is

absolute permittivity of free space)

- (1) $\text{N m}^2/\text{C}$ (2) $\text{N m}/\text{C}$
(3) $\text{N C}/\text{m}^2$ (4) $\text{N C}/\text{m}$

40. An electric dipole is kept in uniform electric field. It may experience.

- (1) A force and a torque
(2) Neither a force nor a torque
(3) A force but not a torque
(4) Both (2) and (3)

41. Two charges $+q$ and $-q$ are situated at a certain distance. Then at the point exactly midway between them

- (1) Both electric field and potential are zero
(2) Both electric field and potential are non-zero
(3) Electric field is zero but potential is non-zero
(4) Potential is zero but electric field is non-zero

42. Which of the following quantity related to electrostatic is scalar?

- (1) Electric field (2) Electric flux
(3) Electric potential (4) Both (2) and (3)

43. Ratio of gravitational force to the electrostatic force between one proton and one electron separated by certain distance is (nearly)

- (1) $1 : 10^{43}$ (2) $1 : 10^{36}$
(3) $1 : 10^{11}$ (4) $1 : 10^{40}$

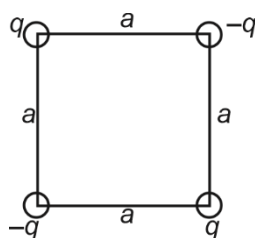
44. Two charges of equal magnitudes and at a distance r exerts a force F on each other. If the charges are doubled and distance between them is halved, then the new force acting on each charge is

- (1) F (2) $4F$
(3) $16F$ (4) $F/16$

45. At a certain distance d from a positive point charge the electric field is 100 V/cm and the potential is 5000 V . The value of distance d is

- (1) 0.2 m (2) 0.5 m
(3) 0.1 m (4) 0.8 m

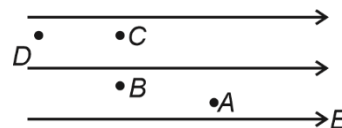
46. Four charges are placed on square as shown in figure. Calculate electrostatic potential energy of the system



(1) $\frac{1}{4\pi\epsilon_0} \frac{q^2}{a} (-4 + \sqrt{2})$ (2) $\frac{q^2}{4\pi\epsilon_0 a} (4 + \sqrt{2})$

(3) $\frac{q^2}{4\pi\epsilon_0 a} (-4 - \sqrt{2})$ (4) $\frac{q^2}{4\pi\epsilon_0} \left(-4 + \frac{1}{\sqrt{2}}\right)$

47. In uniform electric field, four points A, B, C and D are as shown in diagram. Which of following about electric potential is correct



- (1) $V_C = V_B = V_A = V_D$ (2) $V_A > V_D > V_C > V_B$
(3) $V_D > V_C = V_B > V_A$ (4) $V_A > V_B = V_C > V_D$

48. Two concentric shells having charge q and $2q$ of radius a and b respectively ($a > b$). The electric potential at a distance r ($b < r < a$) from center of shell is

(1) $\frac{3q}{4\pi\epsilon_0 r}$ (2) $\frac{q}{4\pi\epsilon_0 a} + \frac{2q}{4\pi\epsilon_0 r}$

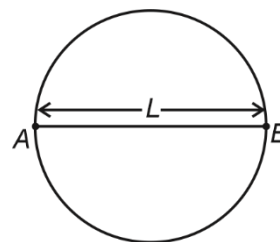
(3) $\frac{2q}{4\pi\epsilon_0 a} + \frac{q}{4\pi\epsilon_0 b}$ (4) $\frac{3q}{4\pi\epsilon_0 b}$

49. Two charges, $+q$ and $-q$ each of mass m are revolving in a circle of radius R under mutual electrostatic force. The speed of each charge is

(1) $\sqrt{\frac{q^2}{16\pi\epsilon_0 mR}}$ (2) $\sqrt{\frac{q^2}{4\pi\epsilon_0 mR}}$

(3) $\sqrt{\frac{q^2}{16\pi\epsilon_0 R}}$ (4) $\sqrt{\frac{q^2}{4\pi\epsilon_0 R}}$

50. A charged wire AB of length L is placed inside a sphere, as shown in figure. Linear charge density of wire is $\lambda = kx$, where x is the distance measured along the wire from end A and k is constant. The flux through sphere is



(1) $\frac{KL^2}{4\epsilon_0}$ (2) $\frac{KL^2}{3\epsilon_0}$

(3) $\frac{KL^2}{2\epsilon_0}$ (4) $\frac{KL^2}{\epsilon_0}$

CHEMISTRY

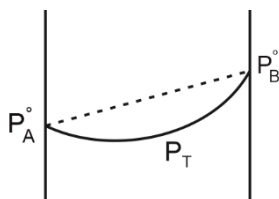
SECTION-A

51. The correct relation between total vapour pressure (P_T) and composition of A and B in vapour phase is

$$(1) \frac{1}{P_T} = \frac{y_A}{P_A^\circ} + \frac{y_B}{P_B^\circ} \quad (2) P_T = \frac{P_A^\circ}{y_A} + \frac{P_B^\circ}{y_B}$$

$$(3) \frac{1}{P_T} = \frac{P_A^\circ}{y_A} + \frac{P_B^\circ}{y_B} \quad (4) P_T = \frac{y_A}{P_A^\circ} + \frac{y_B}{P_B^\circ}$$

52. Consider the graph and predict incorrect option.



- (1) $\Delta H_{\text{mix}} < 0$
 (2) $\Delta S_{\text{mix}} < 0$
 (3) $\Delta V_{\text{mix}} < 0$
 (4) Negative deviation from Raoult's law
53. **Statement-I:** 95% ethanol in water by volume, makes an azeotropic mixture.
Statement-II: Maximum boiling azeotropes are solutions formed by solutions with positive deviation under azeotropic conditions.
- (1) Both statement-I and II are true
 (2) Both statement-I and II are false
 (3) Statement-I is false but statement II is true
 (4) Statement-I is true but statement II is false
54. The vapour pressure of pure liquid at 25°C is 200 mm Hg. The relative lowering of vapour pressure if the mole fraction of solvent in solution is 0.6
- (1) 0.2 (2) 0.6
 (3) 0.4 (4) 1.4
55. If 20 g oxalic acid is mixed with 180 g water at room temperature, then mass percentage of oxalic acid in the mixture is
- (1) 11.11% (2) 10%
 (3) 9% (4) 20%
56. If mole fraction of NaOH in its aqueous solution is 0.2, then approximate molality of NaOH solution will be

- (1) 13.9 (2) 10.9
 (3) 6.25 (4) 12.5
57. If 0.6 g of urea is dissolved in a 2 g of solvent caused elevation of 3.4°C in boiling point. The molal elevation constant of solvent is
- (1) 0.34 K kg mol⁻¹ (2) 0.51 K kg mol⁻¹
 (3) 1.86 K kg mol⁻¹ (4) 0.68 K kg mol⁻¹

58. On dissolving a non-volatile and non-electrolyte solute in water, the vapour pressure of water decreases to 740 mm Hg. The molality of solution approximately will be (Vapour pressure of pure water : 760 mm Hg)

- (1) 1.5 m (2) 1.2 m
 (3) 2.5 m (4) 3.5 m

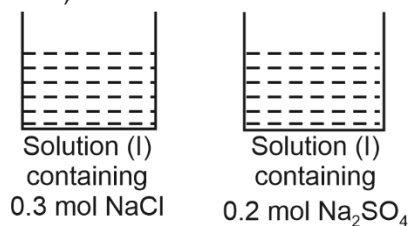
59. Correct statement among the following regarding osmosis is

- (1) Solute flows from high concentration to low concentration
 (2) Solute flows from low concentration to high concentration
 (3) Solvent flows from low concentration to high concentration
 (4) Solvent flow from high concentration to low concentration

60. If benzoic acid dimerizes to 60% in benzene then van't Hoff factor (i) will be

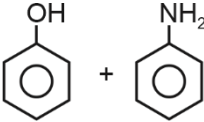
- (1) 0.6 (2) 0.7
 (3) 0.3 (4) 1.7

61. If following two solutions (I and II) are prepared by dissolving solute NaCl and Na₂SO₄ separately in a fixed amount of solvent (Assuming complete ionization)



Then, which statement(s) is/are correct?

- (1) The colligative properties of solution (I) is higher than solution (II)
 (2) The colligative properties of solution (II) is higher than solution (I)
 (3) Both solution (I) and solution (II) have similar values of colligative properties
 (4) The van't Hoff factor in solution I and in solution II are same

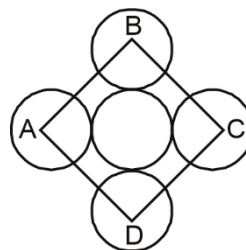
62. Among the following, which statement is not correct for azeotropic solutions?
- These are examples of binary mixtures having similar composition in liquid and vapour phase
 - These mixture do not have fixed boiling point
 - Separation of components of these mixtures is not possible by using fractional distillation
 - Azeotropic conditions in a mixture occurs at a fixed composition
63. The value of ebullioscopic constant depends upon
- Nature of solute
 - $\Delta S_{\text{solution}}$
 - Freezing point of solution
 - Nature of solvent
64. Which of the following relation is not correct?
- $\Delta T_f = (T_f)_{\text{solvent}} - (T_f)_{\text{solution}}$ $\{(T_f : \text{Freezing point})\}$
 - $\Delta T_b = (T_b)_{\text{solution}} - (T_b)_{\text{solvent}}$ $\{(T_b : \text{Boiling point})\}$
 - $\frac{\Delta P}{P_{\text{solvent}}} = \text{mole fraction of non volatile solute}$
 - $\pi = \frac{CRT}{V}$ $\pi : \text{osmotic pressure}$
65. Correct option for the weak electrolyte(AB) which dissociates is
- $i > 1$ and $\alpha > 1$
 - $i > 1$ and $\alpha < 1$
 - $i < 1$ and $\alpha > 1$
 - $i < 1$ and $\alpha < 1$
66. Elevation in boiling point for 1 m glucose, 1 m BaCl_2 and 1 m KCl respectively are in the ratio of
- 1 : 2 : 3
 - 3 : 2 : 1
 - 1 : 3 : 2
 - 2 : 1 : 3
67. Which of the following is not an example of an ideal solution?
- $\text{C}_6\text{H}_6 + \text{C}_6\text{H}_5\text{CH}_3$
 - $\text{C}_2\text{H}_5\text{Cl} + \text{C}_2\text{H}_5\text{Br}$
 - $n\text{-C}_6\text{H}_{14} + n\text{-C}_7\text{H}_{16}$
 - 
68. Which of the following is not correct statement for solubility of gases in the liquid?
- Solubility depend on nature of gas
 - Solubility depend on nature of solvent
 - Solubility increase with increase in pressure
 - Solubility increase with increase in temperature
69. Henry's law constant for $\text{O}_2(\text{g})$ in water at 25°C is $0.35 \times 10^5 \text{ atm}$. The mole of $\text{O}_2(\text{g})$ dissolved in 10 mol water at 25°C and at $\text{O}_2(\text{g})$ pressure of 0.2 atm will be
- 10 mol
 - 10^{-2} mol
 - 10^{-4} mol
 - $5.7 \times 10^{-5} \text{ mol}$
70. Incorrect option regarding crystalline solids is
- They are long range order solids
 - They are Isotropic in nature
 - On cutting they give sharp and smooth edges
 - They have characteristic enthalpy of fusion
71. Which of the following is not an example of covalent or network crystalline solid?
- C(diamond)
 - SiO_2
 - C(graphite)
 - I_2
72. Ferromagnetic substance among the following is
- NaCl
 - CrO_2
 - MnO
 - Fe_3O_4
73. Rhombic sulphur exhibits which of the following geometry?
- Cubic
 - Monoclinic
 - Triclinic
 - Orthorhombic
74. At room temperature, Cr(atomic mass = 52) has bcc structure. Number of unit cells present in 5.2 g of Cr is
- $0.5 N_A$
 - $0.05 N_A$
 - $0.1 N_A$
 - $0.01 N_A$
75. Sodium forms bcc crystal structure. If the edge length (a) of unit cell is 360 pm, then atomic radius of sodium is
- $60\sqrt{3} \text{ pm}$
 - $90\sqrt{3} \text{ pm}$
 - $30\sqrt{3} \text{ pm}$
 - 90 pm
76. Strontium when heated from room temperature to high temperature (T) transforms its structure from fcc to bcc. The ratio of density of strontium at room temperature to that at high temperature (T) is (Assuming molar mass and atomic radii of Sr remains constant with temperature)
- $\frac{\sqrt{2}}{\sqrt{3}}$
 - $\frac{3\sqrt{2}}{4\sqrt{3}}$
 - $\frac{3\sqrt{3}}{4\sqrt{2}}$
 - $\frac{4\sqrt{2}}{3\sqrt{3}}$

77. Iron exhibits fcc structure at temperature above 900°C . If the distance between nearest atoms is 360 pm, then the edge length of the unit cell is
- (1) $180\sqrt{2}$ pm (2) $360\sqrt{2}$ pm
(3) $90\sqrt{2}$ pm (4) $45\sqrt{2}$ pm
78. The effective number of atoms in a cubic unit cell if atoms are on each corner and on each edge centre is
- (1) 8 (2) 6
(3) 4 (4) 2
79. Density of a metal (M) of molar mass 50 g mol^{-1} is 3.64 g cm^{-3} . If edge length of unit cell in which the metal crystallize is 450 pm, then the type of unit cell will be
- (1) Simple cubic (2) bcc
(3) fcc (4) hcp
80. Number of tetrahedral voids and octahedral voids (per atom) present in CCP structure respectively are
- (1) 8, 4 (2) 4, 8
(3) 2, 1 (4) 3, 1
81. If in spinel structure, oxide ions are present in ccp lattice, half of the octahedral voids are occupied by Al^{3+} ions and $\left(\frac{1}{8}\right)$ tetrahedral voids are occupied by Mg^{2+} ions, then formula of ionic compound is
- (1) MgAl_4O_7 (2) MgAl_2O_4
(3) $\text{MgAl}_6\text{O}_{10}$ (4) $\text{MgAl}_8\text{O}_{13}$
82. Which of the following set of solids contains only ionic solids?
- (1) KCl, MgO and SiC (2) SiO_2 , SiC and AlN
(3) KCl, CsCl and MgO (4) CsCl, SiC and NaCl
83. If 10^{-4} mole SrCl_2 is doped in NaCl crystal system, number of moles of vacant site available in crystal is
- (1) 10^{-2} mole (2) 2×10^{-2} mole
(3) 2×10^{-4} mole (4) 10^{-4} mole
84. The formula of FeO generally ranges from $\text{Fe}_{0.93}\text{O}$ to $\text{Fe}_{0.96}\text{O}$ due to
- (1) Impurity defect
(2) Frenkel defect
(3) Metal excess defect
(4) Metal deficiency defect

85. Type of solid obtained on doping pure silicon with phosphorous (impurity) is
- (1) Intrinsic semiconductor
(2) p-Type semiconductor
(3) n-type semiconductor
(4) Insulator

SECTION-B

86. If an ionic crystal of general formula has coordination number of 8 for both cation and anion, then value of radius ratio of cation to anion will be
- (1) Greater than 0.732
(2) Between 0.414 and 0.732
(3) Between 0.225 and 0.414
(4) Between 0.155 and 0.225
87. Packing efficiency of following square unit cell approximately is (Assume each circle are of equal size)



- (1) 39.27% (2) 68.02%
(3) 91% (4) 78.5%
88. In which of the following ionic solids, all tetrahedral voids are filled?
- (1) NaCl
(2) ZnS (Zinc blende)
(3) CaF_2
(4) CsCl
89. **Statement-I:** Packing efficiency of CCP and HCP are same.
Statement-II: In 3D close packing, arrangement of layers in CCP and HCP are same.
- (1) Statement I is false but statement II is true
(2) Statement I is true but statement II is false
(3) Both statement I and II are true
(4) Both statement I and II are false
90. Number of tetrahedral voids in fcc unit cell which are shared with other unit cells is
- (1) 8 (2) 1
(3) Zero (4) 10

91. Radius ratio of cation to anion in tetrahedral void is
- (1) $0.155 \leq \frac{r_+}{r_-} < 0.225$ (2) $0.414 \leq \frac{r_+}{r_-} < 0.732$
- (3) $0.225 \leq \frac{r_+}{r_-} < 0.414$ (4) $0.732 \leq \frac{r_+}{r_-} < 1$
92. In solid AB, B⁻ are present at the corners and A⁺ are at the face centres. If the edge-length of unit cell is 508 pm. Radius of the cation is 110 pm, then radius of anion
- (1) 110 pm
(2) 249 pm
(3) 618 pm
(4) 398 pm
93. TiCl has structure similar to CsCl. Coordination number of Ti⁺ is
- (1) 6 (2) 12
(3) 8 (4) 4
94. Empty space left in simple cubic unit cells is
- (1) 47.6% (2) 52.4%
(3) 26% (4) 32%
95. Which of the following concentration terms is temperature dependent?
- (1) Mole fraction
(2) (w/w)%
(3) Molality
(4) Molarity
96. Which of the following colligative properties is preferred to determine molar masses of proteins, polymers and other macromolecules?
- (1) Relative lowering of vapour pressure
(2) Osmotic pressure
(3) Elevation in boiling point
(4) Depression in freezing point
97. Vapour pressure of the liquid
- (1) Increase with increase in temperature
(2) Decrease with increase in temperature
(3) Is independent of temperature
(4) Increase with increase in surface area
98. The solution having higher osmotic pressure than the reference solution is called
- (1) Hypertonic solution
(2) Isotonic solution
(3) Hypotonic solution
(4) Ideal solution
99. **Statement-I:** Addition of a non-volatile solute to a volatile solvent increases the boiling point.
Statement-II: Addition of non-volatile solute to a volatile solvent result in decrease in the vapour pressure
- (1) Statement I is true but statement-II is false
(2) Both statement I and statement II are true
(3) Both statement I and statement are false
(4) Statement I is false but statement-II is true
100. Match the list-I with list-II and choose the option.
- | List-I
(Crystal system) | List-II
(Axial angles) |
|------------------------------------|---|
| (a) Cubic | (i) $\alpha \neq \beta \neq \gamma \neq 90^\circ$ |
| (b) Hexagonal | (ii) $\alpha = \beta = \gamma \neq 90^\circ$ |
| (c) Trigonal | (iii) $\alpha = \beta = 90^\circ, \gamma = 120^\circ$ |
| (d) Triclinic | (iv) $\alpha = \beta = \gamma = 90^\circ$ |
- (1) a(iv), b(i), c(ii), d(iii)
(2) a(ii), b(iii), c(i), d(iv)
(3) a(iv), b(ii), c(iii), d(i)
(4) a(iv), b(iii), c(ii), d(i)

BOTANY

SECTION-A

101. Asexual reproduction is common in
- (1) Single celled organisms
(2) Organism with complex organisation
(3) Higher plants and animals only
(4) Bacteria only
102. Select the **correct** match w.r.t. vegetative propagules in angiosperms.
- (1) Sucker – Grasses
(2) Root buds – *Opuntia*
(3) Leaf buds – *Bryophyllum*
(4) Bulb – Ginger

103. In *Chlamydomonas*, zoospores are

- (1) Laterally flagellated
- (2) Biflagellated
- (3) Exogenously originated
- (4) Non-motile asexual spores

104. Match the following columns and choose the **correct** option.

Column-I**Column-II**

- | | |
|-------------------|--------------------------|
| a. Conidia | (i) Yeast |
| b. Budding | (ii) Onion |
| c. Bulb | (iii) <i>Penicillium</i> |
| d. Binary fission | (iv) <i>Amoeba</i> |

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

105. Select the plants which do **not** show clear distinction in phases of life cycle.

- (1) Annual plants (2) Biennial plants
 (3) Polycarpic plants (4) Monocarpic plant

106. The senescent phase.

- a. Is a pre-reproductive phase.
 b. Involves structural and functional deterioration.
 c. Is a post-reproductive phase.
 (1) Both a and b are correct
 (2) Only b is correct
 (3) Both b and c are incorrect
 (4) Only a is incorrect

107. In which of the following plants, vegetative propagation occurs by bulbils?

- (1) Potato
 (2) Jasmine
 (3) *Agave*
 (4) Mint

108. Choose the **correct** option w.r.t. internal fertilisation.

- (1) It is present only in algae
 (2) Male gametes are always non-motile
 (3) Male gametes are transferred either through water or pollen tube to female gametes
 (4) Male gametes are produced in very small number

109. Which one of the following set of plants are heterogametic?

- (1) *Cladophora* and *Rhizopus*
 (2) *Fucus* and *Synchytrium*
 (3) *Chara* and *Fucus*
 (4) *Ulothrix* and *Chlamydomonas*

110. How many of the following processes given below is/are post-fertilization events?

| |
|---|
| Gamete transfer, Embryogenesis, Gametogenesis, Endosperm formation, Seed formation. |
|---|

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

111. _____are essential whorls in a flower.

Fill in the blanks with **correct** option.

- (1) Corolla and androecium
 (2) Calyx and corolla
 (3) Androecium and gynoecium
 (4) Calyx and gynoecium

112. In pollen grain of an angiosperm, the vegetative cell is

- (1) Small in size with dense cytoplasm
 (2) Spindle shaped with abundant food
 (3) Bigger in size with irregularly shaped nucleus
 (4) Spindle shaped with dense cytoplasm

113. Choose the **correct** statement w.r.t. sporopollenin.

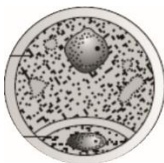
- (1) It can withstand high temperature, strong acid and alkali
 (2) It can be degraded by the activity of protease enzyme
 (3) It is one of the most resistant organic material found in all vascular plants
 (4) Present on both outer and inner layer of pollen cell wall

114. The typical embryo sac in an angiospermic plant contains_____before fertilisation.

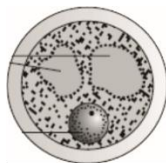
- (1) 8-nuclei
 (2) 8-cells
 (3) 6-nuclei
 (4) 3-cells

115. Choose the plants that produce both types of flowers, i.e. cleistogamous and chasmogamous flowers.
- (1) Pea and rice
 - (2) *Oxalis* and *Commelina*
 - (3) *Hydrilla* and *Vallisneria*
 - (4) Maize and wheat
116. Mark the **odd** one w.r.t. ploidy level.
- (1) Nucellus
 - (2) Megaspore mother cell
 - (3) Funicle
 - (4) Primary endosperm nucleus
117. Consider the following statements and state **True** (T) or **False** (F).
- A. Pollen consumption has been claimed to increase the performance of athletes and race horses.
 - B. Pollen viability for rice and wheat plant is for several months.
 - C. Storage of pollen grains for years in liquid N₂ for use in plant breeding programmes is called cryopreservation.
- | A | B | C |
|-------|---|---|
| (1) T | F | T |
| (2) T | T | F |
| (3) F | T | T |
| (4) T | F | F |
118. The period of viability of the pollen grains depends on
- (1) Temperature and humidity
 - (2) Its inner wall layer
 - (3) Nutrients in primary endosperm cell
 - (4) Pressure
119. Select the adaptation seen in plant that ensures seed formation even in the absence of pollinating agent.
- (1) Cleistogamy
 - (2) Self-incompatibility
 - (3) Dichogamy
 - (4) Dioecy
120. Which of the following phenomenon is functionally cross pollination but genetically self pollination?
- (1) Xenogamy
 - (2) Geitonogamy
 - (3) Autogamy
 - (4) Cleistogamy
121. In a flowering plant, the number of chromosomes in zygote is 24. What will be the number of chromosomes in antipodal cells, secondary nucleus and primary endosperm nucleus, respectively?
- (1) 12, 12, 36
 - (2) 12, 12, 24
 - (3) 12, 24, 36
 - (4) 24, 24, 36
122. Which of the following plants is pollinated by insects?
- (1) *Zostera*
 - (2) *Vallisneria*
 - (3) Sea grass
 - (4) Water hyacinth
123. Germination of pollen grain in laboratory can be done in/by
- (1) 20% salt solution
 - (2) 10% sugar solution
 - (3) Emasculation
 - (4) Treating with hot water
124. For double fertilisation in angiosperms _____ nuclei are involved.
- Fill in the blank with **correct** option.
- (1) Two
 - (2) Seven
 - (3) Five
 - (4) Six
125. Which of the following statements is **false**?
- (1) There is no need for emasculation in unisexual flowers for hybridisation experiments
 - (2) Pollen grains can be stored in pollen banks
 - (3) In most of the flowering plants, pollen tube enters into ovule through chalaza
 - (4) Double fertilisation does not occur in gymnosperms
126. The oldest viable seed excavated from Arctic Tundra is of
- (1) Date palm
 - (2) *Lupine*
 - (3) Orchid
 - (4) *Phoenix dactylifera*
127. Seed germination requires all the conditions given, **except**
- (1) Suitable temperature
 - (2) Oxygen
 - (3) Adequate moisture
 - (4) Darkness

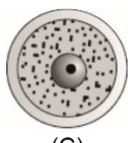
128. Emasculation is
- Removal of stigma before maturation
 - Removal of anthers before its dehiscence
 - Required for desired pollination
- Only a is correct
 - Both b and c are correct
 - Both a and c are correct
 - All a, b and c are correct
129. In monocot plant the cotyledon is called
- Scutellum
 - Epicotyl
 - Radicle
 - Plumule
130. Development stages of a microspore are given below. Arrange them in the correct sequence of development into a mature male gametophyte.



(A)



(B)



(C)



(D)

- $A \rightarrow C \rightarrow B \rightarrow D$
 - $B \rightarrow C \rightarrow D \rightarrow A$
 - $C \rightarrow B \rightarrow D \rightarrow A$
 - $C \rightarrow D \rightarrow B \rightarrow A$
131. The nucellar embryos formed in few flowering plants are A and they can be called B.

Select the **correct** option for A and B.

A**B**

- | | |
|--------------|------------|
| (1) Triploid | Offsprings |
| (2) Haploid | Clones |
| (3) Diploid | Clones |
| (4) Haploid | Offsprings |
132. Which one of the following plants flower once in 12 years and last time flowered in September-October (2018)?
- Bambusa tulda*
 - Marigold
 - Strobilanthus kunthiana*
 - Sunflower

133. In angiosperms, the landing platform for the pollen grains is
- Thalamus
 - Ovary
 - Stigma
 - Ovule
134. The largest cell of embryo sac is
- Egg cell
 - Antipodal cell
 - Central cell
 - Synergid
135. In majority of angiosperms, shedding of pollen grains takes place at
- Three-celled stage
 - Four-celled stage
 - Two-celled stage
 - Single celled stage

SECTION-B

136. Select the **incorrect** statement w.r.t. sexual reproduction.
- It has evolutionary importance
 - It is a complex process
 - New individuals are genetically identical to their parents
 - New individual develops from zygote
137. In which one of the following pairs, both the plants can be vegetatively propagated by sucker?
- Banana and ginger
 - Sugarcane and *Opuntia*
 - Agave* and *Oxalis*
 - Chrysanthemum* and pineapple
138. Select the **incorrect** statement.
- Meiosis maintains chromosome number in species.
 - Meiosis reduces the chromosome number to half in gametes.
 - Formation of fruits without fertilisation is called parthenocarpy.
 - Syngamy results in the formation of gametes.
139. Which among the following is **not** a monoecious plant?
- Coconut
 - Cucurbit
 - Chara*
 - Marchantia*

140. Consider the following statements related to anther walls and choose the **correct** option.
 A : Epidermis is outermost, single layer which is protective in function.
 B : Cells of middle layer are ephemeral and degenerates at maturity.
 (1) Only statement A is incorrect
 (2) Only statement B is incorrect
 (3) Both the statements A and B are incorrect
 (4) Both the statements A and B are correct
141. All are characteristics of water pollinated flowers, **except**
 (1) Long, sticky stigma
 (2) Unwettable stigma
 (3) Light, unwettable pollen grains
 (4) Sticky pollen grains but non-sticky stigma
142. Apomixis is formation of
 (1) Seeds without fertilisation
 (2) Fruits without fertilisation
 (3) Female gamete from megaspore mother cell
 (4) Male gamete in pollen grain
143. The progenitor of next generation inside the mature seed is
 (1) Endosperm (2) Embryo
 (3) Perisperm (4) Nucellus
144. Mark the **incorrect** statement about pollen grains.
 (1) It represents the male gametophyte
 (2) Its cell wall is known as sporoderm
 (3) Generally spherical in shape
 (4) Always diploid in monocots
145. Water hyacinth
 (1) Propagates only by sexually at a phenomenal rate and spread all over the water body
 (2) Drains oxygen from the water body and leads to death of fishes
 (3) Is introduced in India for its fleshy fruits
 (4) Is most invasive weed growing in flowing water
146. The ovary develops into fruit which develops a thick wall called
 (1) Pericarp (2) Testa
 (3) Capsule (4) Theca
147. Select the seed with no residual endosperm at maturity.
 (1) Groundnut (2) Maize
 (3) Barley (4) Castor
148. In which group of organisms, zygote secretes a thick wall that is resistant to desiccation and damage?
 (1) Algae (2) Pteridophyte
 (3) Gymnosperm (4) Angiosperm
149. Cells of which layer in wall of microsporangium helps in dehiscence of anther due to their hygroscopic nature?
 (1) Middle layer (2) Endothecium
 (3) Epidermis (4) Tapetum
150. Identify the **incorrect** statement.
 (1) Life span is a specific trait of each organism
 (2) Unicellular organisms are said to be immortal
 (3) Life span is necessarily correlated with size and complexity of an organism
 (4) Mango tree lives for 200 years while peepal for 2500 years

ZOOLOGY

SECTION-A

151. Each testis of an adult human male has about
 (1) 250 testicular lobules
 (2) 350 testicular lobules
 (3) 25 testicular lobules
 (4) 15 testicular lobules
152. Seminiferous tubules in human testis are internally lined by male germ cells and
 (1) Spermatozoa (2) Sertoli cells
 (3) Leydig cells (4) Interstitial cells
153. Which of the following is a primary sex organ of human female reproductive system?
 (1) Oviduct
 (2) Uterus
 (3) Vagina
 (4) Ovary
154. The layer of uterine wall that undergoes cyclic changes during menstrual cycle is
 (1) Myometrium (2) Perimetrium
 (3) Endometrium (4) Cervical canal

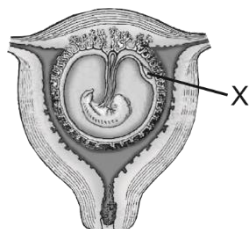
155. The opening of vagina is often covered partially by a membrane called
 (1) Clitoris (2) Hymen
 (3) Infundibulum (4) Labia majora
156. Each human mammary gland is divided into 15-20 mammary lobes containing clusters of milk secreting cells called alveoli. These alveoli open into
 (1) Lactiferous duct (2) Mammary ducts
 (3) Ampulla (4) Mammary tubules
157. Which of the following cells periodically undergo meiosis during gametogenesis?
 (1) Primary spermatocytes
 (2) Ootids
 (3) Sertoli cells
 (4) Leydig cells
158. The hormone that acts on Leydig cells and stimulates the secretion of testosterone is
 (1) FSH (2) LH
 (3) GnRH (4) Estrogen
159. During spermatogenesis, FSH acts on
 (1) Leydig cells (2) Spermatogonia
 (3) Sertoli cells (4) Interstitial cells
160. Spiral mitochondrial arrangement is present in
 (1) Sperm (2) Ovum
 (3) Spermatogonium (4) Primary oocyte
161. Oogenesis in human females is initiated during
 (1) Adolescence stage (2) Infant stage
 (3) Embryonic stage (4) Adult stage
162. The stage of ovarian follicle where secondary oocyte is formed by meiosis-I is
 (1) Primary follicle (2) Secondary follicle
 (3) Tertiary follicle (4) Graafian follicle
163. Which of the following features **does not** characterise tertiary follicle during oogenesis?
 (1) Presence of antrum
 (2) Presence of theca interna and theca externa
 (3) Primary oocyte grows in size
 (4) Formation of second polar body
164. Middle piece of human sperm contains
 (1) Nucleus (2) Acrosome
 (3) Axial filament (4) Golgi complex
165. A healthy human male ejaculates _____ million of sperms during each coitus.
 Mark the option that fills the blank **correctly**.
 (1) 50-100 (2) 200-300
 (3) 10-50 (4) 500-1000
166. Choose the **correct** match w.r.t. ploidy of different cells of gametogenesis in humans.

| (Stage of gamete) | (Ploidy) |
|--------------------------|----------|
| (1) Primary spermatocyte | Haploid |
| (2) Secondary oocyte | Haploid |
| (3) Ootid | Diploid |
| (4) Spermatogonium | Haploid |
167. Menstrual cycle in human females starts with
 (1) Menstrual phase (2) Proliferative phase
 (3) Secretory phase (4) Ovulatory phase
168. Which of the following events of menstrual cycle leads to menstruation?
 (1) Degeneration of corpus luteum
 (2) Increase in concentration of progesterone
 (3) Increase in concentration of FSH
 (4) Fertilisation of egg with sperm in fallopian tube
169. Which of the following structures is formed within primary sex organ?
 (1) Ootid formation
 (2) Placenta
 (3) Embryo
 (4) Formation of secondary oocyte
170. In human, after implantation, inner cell mass differentiates into
 (1) Outer endoderm and inner ectoderm
 (2) Outer mesoderm and inner endoderm
 (3) Outer ectoderm and inner endoderm
 (4) Outer endoderm and inner mesoderm
171. The milk produced by mammary glands during the initial few days of lactation is called
 (1) Colostrum (2) Mucus
 (3) Seminal plasma (4) Antrum
172. If the sperm count of a human male is 200 million per ejaculate, then for normal fertility, at least how many sperms must have normal shape, size and vigorous motility?
 (1) 120 million (2) 48 million
 (3) 80 million (4) 60 million

173. Which of the following is true for the location of epididymis?

- (1) Anterior border of testis
- (2) Posterior border of testis
- (3) Ventral border of testis
- (4) Inferior surface of testis

174. Identify 'X' in the given figure.



Select the correct option.

- (1) Embryo
- (2) Yolk sac
- (3) Placental villi
- (4) Plug of mucus

175. Enlarged end of human penis is called

- (1) Clitoris
- (2) Foreskin
- (3) Prostatic urethra
- (4) Glans penis

176. Choose the **correct** statement regarding female reproductive system.

- (1) Each ovary is covered by a thin epithelium which encloses the ovarian stroma.
- (2) Cortex region of ovary is divided into outer stroma and inner medulla.
- (3) Isthmus part of fallopian tube is closer to ovary than uterus.
- (4) Cervical canal directly opens into fallopian tube.

177. Spermatids are transformed into spermatozoa by the process of

- (1) Spermiogenesis
- (2) Spermiogenesis
- (3) Capacitation
- (4) Karyokinesis

178. Which of the following hormones is only produced by placenta in females?

- (1) Estrogen
- (2) Progesterone
- (3) hCG
- (4) Thyroxine

179. The body of foetus is covered with fine hair and eye-lashes are formed by the end of

- (1) 12 weeks
- (2) 10 weeks
- (3) 4 weeks
- (4) 24 weeks

180. Embryo with 8 to 16 blastomeres is called

- (1) Zygote
- (2) Morula
- (3) Blastocyst
- (4) Foetus

181. The process in which female gamete undergoes development to form new organism without fertilisation is called

- (1) Syngamy
- (2) Gametogenesis
- (3) Parthenogenesis
- (4) Cytokinesis

182. In which of the following animals, syngamy occurs usually in the external medium?

- (1) Amphibians
- (2) Mammals
- (3) Birds
- (4) Reptiles

183. Consider the following statements.

- a. Zygote is a vital link that ensures continuity of species between organisms of one generation and the next.
- b. Every sexually reproducing organism, including human beings begin life as a single cell *i.e* the zygote.
- c. Embryogenesis refers to the process of development of embryo from the ovum.
- d. Reptiles and amphibians are oviparous animals with some exceptions.

Choose the option with **correct** statements.

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

184. In non-primate mammals like cows, sheep, rat, deer, dog and tiger, cyclic changes occur during reproduction. These changes constitute

- (1) Menstrual cycle
- (2) Oestrous cycle
- (3) Morphogenesis
- (4) Parthenogenesis

185. Consider the following animals

- a. Earthworm
- b. Sponge
- c. Tapeworm
- d. Leech

Which among the above are bisexual animals?

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

SECTION-B

186. Select the **incorrect** match from the following

| (Organism) | (Chromosome number in meiocyte) |
|-----------------|---------------------------------|
| (1) Human being | 46 |
| (2) Rat | 42 |
| (3) Fruit fly | 8 |
| (4) Butterfly | 320 |

187. In reptiles and birds, fertilised egg is covered by hard

- | | |
|-----------------------|----------------------|
| (1) Chitinous shell | (2) Calcareous shell |
| (3) Keratinised shell | (4) Cellulosic shell |

188. LH surge occurs during menstrual cycle of human females that causes

- (1) Development of corpus luteum
- (2) Rupture of Graafian follicle to release ovum
- (3) Progesterone levels at its peak
- (4) Decline in FSH levels

189. How many of the following hormones are increased several folds during pregnancy?

Estrogens, Progestogens, Cortisol, Thyroxine

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

190. The following are incorrect statements regarding Sertoli cells of human male reproductive system, **except**

- (1) Sertoli cells undergo meiotic division.
- (2) Sertoli cells are present between seminiferous tubules.
- (3) Sertoli cells do not play any role in spermatogenesis.
- (4) Sertoli cells provide nutrition to germ cells.

191. Which duct of human reproductive system ascends to the abdomen from epididymis?

- | | |
|---------------------|------------------|
| (1) Rete testis | (2) Epididymis |
| (3) Vasa efferentia | (4) Vas deferens |

192. The female external genitalia includes the following **except**

- | | |
|----------------|------------------|
| (1) Mons pubis | (2) Labia majora |
| (3) Clitoris | (4) Vagina |

193. In oogenesis, primary oocytes are temporarily arrested during embryonic development in

- (1) Prophase I of mitotic division
- (2) Prophase II of meiotic division
- (3) Prophase I of meiotic division
- (4) Metaphase II of meiotic division

194. In humans, the placenta is connected to embryo through

- | | |
|--------------------|---------------------|
| (1) Yolk sac | (2) Amnion |
| (3) Umbilical cord | (4) Inner cell mass |

195. The milk let down hormone among the following that acts on myometrium during parturition is

- | | |
|---------------|---------|
| (1) Prolactin | (2) FSH |
| (3) Oxytocin | (4) ADH |

196. Identify the **correct** option regarding human placenta.

- (1) Placenta helps the foetus to breathe properly through lungs
- (2) Placenta secretes hormones
- (3) Supplies excretory wastes to the foetus
- (4) Placenta provides blood supply to the foetus

197. Colostrum is advised mainly to new born as it contains

- | | |
|-----------------|----------------|
| (1) Antibiotics | (2) Antibodies |
| (3) Antitoxins | (4) Albumin |

198. Which among the following is a secondary sexual characteristics?

- | | |
|-------------|------------|
| (1) Breast | (2) Testis |
| (3) Ovaries | (4) Penis |

199. Gestation period of how many weeks mark the completion of second trimester?

- (1) 6 weeks
- (2) 24 weeks
- (3) 12 weeks
- (4) 18 weeks

200. How many spermatozoa will be produced from 4 primary spermatocytes?

- | | |
|-------|--------|
| (1) 4 | (2) 6 |
| (3) 8 | (4) 16 |

