09-04-2019

Code - B

Aakash
Medical | IIT-JEE | Foundations
(Divisions of Aakash Educational Services Limited)
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MM : 720

Test Series for NEET - 2019
Test – 6

Time : 3 Hrs.

Topics Covered :

Physics : Electrostatics

Chemistry : Solid State, Solutions, Electrochemistry, Chemical Kinetics, Surface Chemistry

Botany : Reproduction in Organisms, Sexual reproduction in flowering plants.

Zoology : Reproduction in Organisms, Human Reproduction, Reproductive Health.

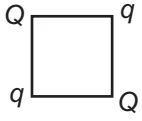
Instructions :

(i) Use Blue/Black ballpoint pen only to darken the appropriate circle.
(ii) Mark should be dark and should completely fill the circle.
(iii) Dark only one circle for each entry.
(iv) Dark the circle in the space provided only.
(v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
(vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from total score.

PHYSICS

Choose the correct answer :

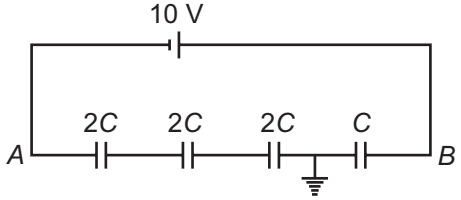
1. Two equal charges Q are placed at the two opposite corners of a square and charges q are placed at the two other opposite corners of square as shown in figure. If the resultant force on Q is zero, then relation between q and Q is



(1) $Q = -\frac{q}{2\sqrt{2}}$ (2) $Q = -2\sqrt{2}q$

(3) $Q = -2q$ (4) $Q = 2\sqrt{2}q$

2. In the circuit shown in figure, potential of points A and B are respectively



(1) –8 V, 2 V (2) $\frac{10}{3}$ V, $\frac{20}{3}$ V

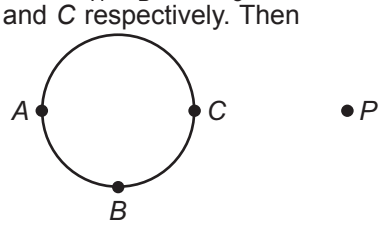
(3) –6 V, 4 V (4) $-\frac{10}{3}$ V, $\frac{20}{3}$ V

3. Point charges $4q$, $-q$ and $4q$ kept on a smooth horizontal surface on the x-axis at points $x = 0$, $x = a$ and $x = 2a$ respectively. Then correct option is

(1) Only $(-q)$ is in stable equilibrium
(2) None of the charge is in equilibrium
(3) All the charges are in unstable equilibrium
(4) All the charges are in stable equilibrium

4. A hollow conducting sphere is placed in an electric field produced by a point charge placed at P as shown in figure. Let V_A, V_B and V_C be the potential at points A, B and C respectively. Then

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

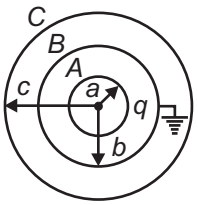


5. Two conducting spheres of radius R_1 and R_2 respectively, are charged and joined by a metallic wire. The ratio of electric fields on the sphere is

(1) $\frac{R_2^2}{R_1^2}$ (2) $\frac{R_1^2}{R_2^2}$

(3) $\frac{R_2}{R_1}$ (4) $\frac{R_1}{R_2}$

6. Figure shows three concentric thin spherical shells *A*, *B* and *C* of radii *a*, *b* and *c* respectively. The shells *A* and *C* are given charge *q* and $-q$ respectively and the shell *B* is earthed. The charge appearing on the outer surface of *C* is



(1) $\frac{b}{c}q$ (2) $q\left(1-\frac{b}{c}\right)$

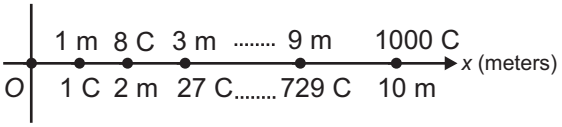
(3) $-\frac{b}{c}q$ (4) $-q\left(1-\frac{b}{c}\right)$

7. A particle of mass *m* and charge $(-q)$ is moving around a fixed charge *q*, in a circle of radius *r*, under electrostatic force of attraction. The total energy of system is

(1) $-\frac{1}{4\pi\varepsilon_0}\frac{q^2}{r}$ (2) $\frac{1}{4\pi\varepsilon_0}\frac{q^2}{2r}$

(3) $-\frac{1}{4\pi\varepsilon_0}\frac{q^2}{2r}$ (4) 0

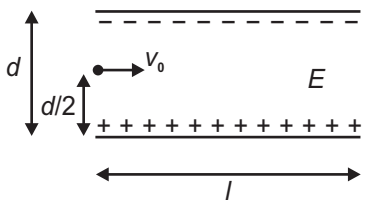
8. If 10 point charges are placed at *x* = 1 m, 2 m, 3 m ... 10 m as shown in figure, then value of electric field at origin '*O*' is $\left(k=\frac{1}{4\pi\varepsilon_0}\right)$



(1) 110 k (2) 60 k

(3) 50 k (4) 55 k

9. The minimum velocity v_0, such that an electron projected as shown in the figure passes between the plates without touching them (Take mass of electron as *m* and charge *e*. *E* is electric field between the plates) is



(1) $l\sqrt{\frac{md}{eE}}$ (2) $l\sqrt{\frac{eE}{md}}$

(3) $l\sqrt{\frac{eE}{2md}}$ (4) $\frac{l}{2}\sqrt{\frac{md}{eE}}$

10. Two charges $+4q$ and $+q$ are placed at a distance *x* apart and free to move. What charge must be placed in between two charges so the system will be in equilibrium?

(1) $-\left(\frac{4}{9}\right)q$

(2) $+\left(\frac{4}{9}\right)q$

(3) $-\left(\frac{16}{9}\right)q$

(4) $+\left(\frac{16}{9}\right)q$

11. Two metal spheres, one of radius *R* and the other of radius $2R$ both have same surface charge density σ. They are brought in contact and separated. The surface charge density of bigger sphere becomes

(1) 2σ (2) $\frac{5}{3}\sigma$

(3) $\frac{5}{6}\sigma$ (4) $\frac{4}{3}\sigma$

12. Electric potential in a region is given by $V = x^2y + 3yz + 5zxy$. The electric field $\vec{E}$ at point (1, 1, 1) is

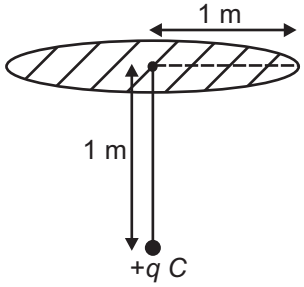
(1) $\vec{E}=-7\hat{i}-9\hat{j}-8\hat{k}$

(2) $\vec{E}=-2\hat{i}-3\hat{j}-5\hat{k}$

(3) $\vec{E}=-7\hat{i}+9\hat{j}+\hat{k}$

(4) $\vec{E}=+7\hat{i}+9\hat{j}+\hat{k}$

13. The electric flux passing through the disc as shown in figure is approximately



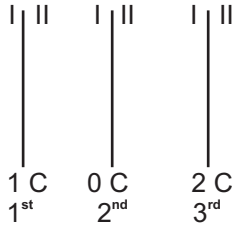
(1) 0.5 q/ε_0

(2) 0.45 q/ε_0

(3) 0.30 q/ε_0

(4) 0.15 q/ε_0

14. If three charged metal plates have charges 1 C, 0 C, and +2 C, then find the charge on side I of second plate



(1) $-\frac{1}{2}$ C (2) $\frac{3}{2}$ C

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

15. Choose the correct statement from the following.

(1) Electric field lines must originate from negative charge

(2) Electric field lines do not form closed loop

(3) Electric field must be a conservative field

(4) Electric field lines can form a closed loop

16. Capacitance of a capacitor depends on

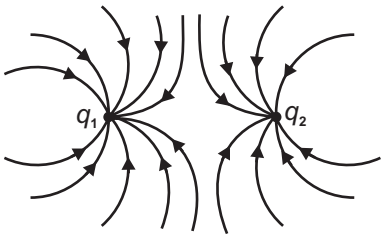
(1) Potential difference applied

(2) Charge on capacitor

(3) Both (1) & (2)

(4) Neither (1) nor (2)

17. Identify the correct statements about the charges q_1 and q_2.



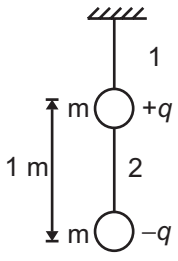
(1) q_1 and q_2 both are positive

(2) q_1 is positive but q_2 is negative

(3) q_2 is positive and q_1 is negative ($|q_1| > |q_2|$)

(4) Both are negative ($|q_1| > |q_2|$)

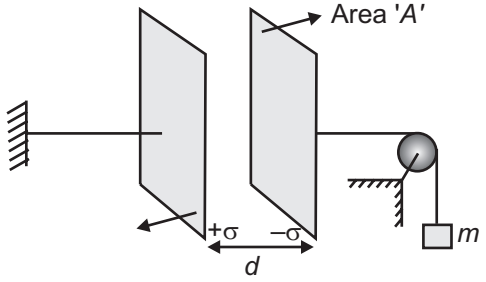
18. Find the value of q so that the tension in string 2 becomes zero. (m is mass of each ball)



(1) $\sqrt{4\pi\varepsilon_0 mg}$ (2) $\sqrt{\frac{mg}{4\pi\varepsilon_0}}$

(3) $\frac{mg}{4\pi\varepsilon_0}$ (4) $\sqrt{\frac{2mg}{4\pi\varepsilon_0}}$

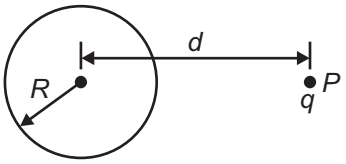
19. The value of mass m so that the system (a parallel plate capacitor) will remain at equilibrium.



(1) Zero (2) $\frac{\sigma^2 A}{\varepsilon_0 g}$

(3) $\frac{\sigma^2 A}{4\varepsilon_0 g}$ (4) $\frac{\sigma^2 A}{2\varepsilon_0 g}$

20. A charge q is placed in front of a neutral metallic sphere. The magnitude of electric field at the centre of sphere due to the induced charge on the surface of sphere is



(1) $E = \frac{1}{4\pi\varepsilon_0}\frac{q}{R^2}$ (2) $E = \frac{1}{4\pi\varepsilon_0}\frac{q}{R}$

(3) $E = \frac{1}{4\pi\varepsilon_0}\frac{q}{d^2}$ (4) Zero

21. There are two concentric conducting shells. The potential of outer shell is 10 V and that of inner shell is 15 V. If the outer shell is grounded, the potential of inner shell is

(1) 25 V

(2) 15 V

(3) 10 V

(4) 5 V

22. A parallel plate capacitor is filled by a dielectric whose relative permittivity varies with applied voltage V as $\varepsilon_r = \alpha V$ where α = 2 per volt. A similar capacitor without dielectric is charged to V_0 = 136 volt. It is then connected to the uncharged capacitor with the dielectric. The final voltage on the capacitors is

(1) 6 volt (2) 68 volt

(3) 4 volt (4) 8 volt

23. Two charges 1 μC and 9 μC are placed 8 cm apart in vacuum. The electric potential between the two charges is minimum at a distance of

(1) 1 cm from 1 μC

(2) 2 cm from 1 μC

(3) 3 cm from 1 μC

(4) 4 cm from 1 μC

24. The electric flux from a cube of edge l is ϕ. The new value of flux if edge length is made $2l$ and charge enclosed is halved is

(1) ϕ (2) $\frac{\phi}{2}$

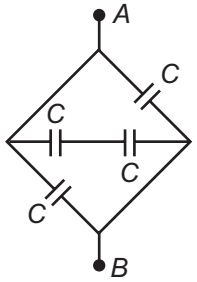
(3) 2ϕ (4) 4ϕ

25. Three capacitors each of capacitance C and breakdown voltage V are joined in series. The capacitance and breakdown voltage of the combination is

(1) $3C, 3V$ (2) $\frac{C}{3}, 3V$

(3) $3C, \frac{V}{3}$ (4) $\frac{C}{3}, \frac{V}{3}$

26. Four identical capacitors are connected as shown in figure. When a battery of 6 V is connected between A and B, the charge drawn from battery is 1.5 μC. The value of C is



(1) 2.5 μF (2) 1 μF

(3) 1.5 μF (4) 0.1 μF

27. Which of the following is incorrect about equipotential surfaces?

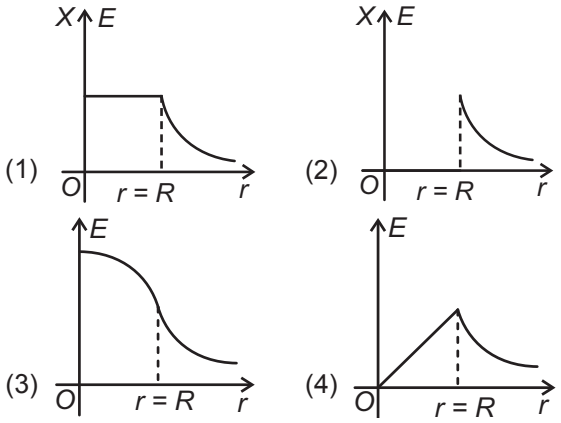
(1) These are closer in regions of strong electric fields compared to regions of weak electric fields

(2) These are more crowded near sharp edges of a conductor

(3) These are more crowded near regions of large charge densities

(4) These are always equally spaced

28. The variation of electric field E due to uniformly charged non-conducting solid sphere with distance (r) from its center (R is the radius of sphere)



29. Two charges $2q$ and $-3q$ are kept on a straight line. The number of points on this line where the electric field intensity is zero, is

(1) 1

(2) 2

(3) 3

(4) Infinite

30. Consider two points 1 and 2 in a region outside a charged sphere. Two points are not very far away from the sphere. If E and V represents electric field and electric potential, then which of the following pair is not possible?

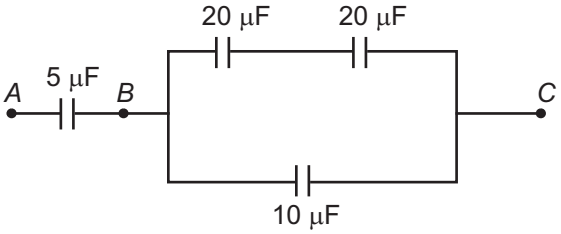
(1) $|\vec{E}_1| = |\vec{E}_2|, V_1 \neq V_2$

(2) $|\vec{E}_1| = |\vec{E}_2|, V_1 = V_2$

(3) $\vec{E}_1 \neq \vec{E}_2, V_1 = V_2$

(4) $\vec{E}_1 \neq \vec{E}_2, V_1 \neq V_2$

31. In the given circuit potential of point A is 3000 V and of C is 1000 V. Then potential of point B is



(1) 2000 V

(2) 1600 V

(3) 1500 V

(4) 1400 V

32. Two concentric metallic spheres of different radius are given equal amount of charge, then

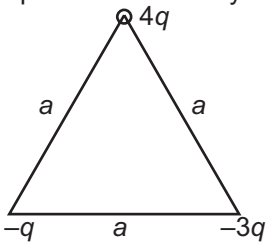
(1) Inner sphere may be at high potential

(2) Inner sphere must be at high potential

(3) Both the spheres are at same potential

(4) Inner sphere must be at zero potential

33. Three charge $4q$, $-q$ and $-3q$ are placed at three vertex of equilateral triangle of side a as shown in figure. The dipole moment of system is



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

(3) $qa\sqrt{10}$ (4) $qa\sqrt{13}$

34. Gauss's law is useful for

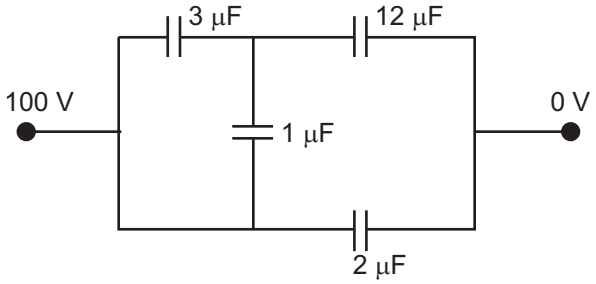
(1) Any closed surface
(2) Some special symmetric closed surface
(3) Only open surface
(4) Irregular surface

35. A rod lies along the x-axis with one end at origin and other end at $x = \infty$. It carries a uniform charge distribution of λ C/m. The electric field at a point on $x = -a$ on the x-axis is

(1) $\vec{E} = \frac{\lambda}{4\pi\varepsilon_0 a}(\hat{i})$ (2) $\vec{E} = \frac{\lambda}{4\pi\varepsilon_0 a}(-\hat{i})$

(3) $\vec{E} = \frac{\lambda}{2\pi\varepsilon_0 a}(-\hat{i})$ (4) $\vec{E} = \frac{\lambda}{2\pi\varepsilon_0 a}(\hat{i})$

36. Four capacitors are connected in a circuit as shown in figure. The charge on capacitor of 1 μF is



(1) 300 μC (2) 75 μC

(3) 150 μC (4) 225 μC

37. A spherical charged conductor has a surface charge density σ. The electric potential of conductor is V. If radius of sphere is halved, keeping charge same, then potential on the surface becomes

(1) 2 V (2) $\frac{V}{2}$

(3) 4 V (4) V

38. Initially an electric dipole is perpendicular to uniform electric field E. If dipole moment is p, then work done to rotate the dipole by an angle 180° from this position is

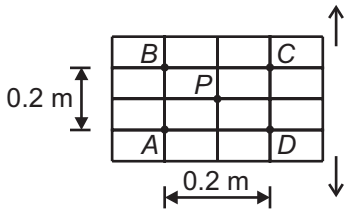
(1) pE (2) Zero

(3) $2pE$ (4) $-pE$

39. For a uniformly charged non-conducting solid sphere, the electric field from its centre

(1) Increases linearly up to the surface
(2) Decreases linearly up to the surface
(3) Remains zero up to the surface
(4) First increases and then decreases up to the surface

40. A, B, C, D, P and Q are points in a uniform electric field. The potential at these points are $V(A) = 3$ volts, $V(P) = V(B) = V(D) = 8$ Volts and V(C) = 13 volts. The electric field at P is



(1) 10 V/m along PA (2) $15\sqrt{2}\ V/m$ along PA

(3) 5 V/m along PC (4) $25\sqrt{2}\ V/m$ along PA

41. A thick walled hollow spherical conducting shell of inner radius r_1 and outer radius r_2 has a charge Q. A charge q is placed at the centre of sphere. The surface charge densities on inner and outer surfaces of the sphere will be respectively

(1) $\frac{-q}{4\pi r_1^2}, \frac{q}{4\pi r_2^2}$ (2) $-\frac{q}{4\pi r_1^2}, \frac{Q+q}{4\pi r_2^2}$

(3) $-\frac{q}{4\pi r_1^2}, \frac{Q-q}{4\pi r_2^2}$ (4) $-\frac{q}{4\pi r_1^2}, \frac{Q}{4\pi r_2^2}$

42. Minimum number of capacitors 8 μF and breakdown voltage 250 V, required to make a combination of 8 μF and 1000 V are

(1) 32 (2) 16

(3) 8 (4) 4

43. A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery, the distance between the plates of the capacitors is decreased using insulating handle. The electric field between the plates

(1) Decreases
(2) Increases
(3) Remains same
(4) First increases then decreases

44. A 3 μF capacitor is charged to a potential of 100 V and 2 μF capacitor is charged to 100 V. The capacitors are then connected in parallel with plates of opposite polarities joined together. The amount of charge flown is

(1) 500 μC (2) 100 μC

(3) 200 μC (4) 240 μC

45. Two identical small conducting sphere having charges Q_1 and Q_2 with ($Q_2 >>> Q_1$). The spheres are at '*d*' distance apart. The force they exert on each other is F_1. The spheres are made to touch each other and then separated by distance *d*. The force they exert on each other is F_2. Then $\frac{F_1}{F_2}$ is

(1) $\frac{4Q_1}{Q_2}$ (2) $\frac{Q_1}{4Q_2}$

(3) $\frac{4Q_2}{Q_1}$ (4) $\frac{Q_2}{4Q_1}$

CHEMISTRY

46. The incorrect statement for metal excess (F-centres) defect is

(1) It imparts colour to the crystal.

(2) It maintains the electrical neutrality of the crystal.

(3) In this, some extra positive ions occupy interstitial sites.

(4) It is a non-stoichiometric defect.

47. Ferromagnetic substance among the following is

(1) Fe_3O_4 (2) MnO

(3) VO_2 (4) CrO_2

48. The radius of B^- ion is 194 pm and of A^+ is 83 pm. The arrangement of the cubical crystal and the position of cation in the crystal can be

(1) Sphalerite type and tetrahedral voids

(2) Fluorite type and tetrahedral voids

(3) Rock salt type and octahedral voids

(4) CsCl type and cubic voids

49. The incorrect statement regarding chemisorption is

(1) It is an irreversible process

(2) It is highly specific in nature

(3) Enthalpy of adsorption is very low

(4) It results into uni-molecular layer on adsorbent surface

50. The catalyst used in the manufacture of chlorine by Deacon's process is

(1) Fe_2O_3 (2) $CuCl_2$

(3) Fe powder (4) Ni powder

51. Which is not a method for purification of colloidal solution?

(1) Dialysis (2) Electro-dialysis

(3) Ultrafiltration (4) Coagulation

52. $FeCl_3$ is added to NaOH solution, the sol obtained is

(1) $Fe_2O_3 \cdot xH_2O$ (2) $Fe_2O_3 \cdot xH_2O/Fe^{3+}$

(3) $Fe_2O_3 \cdot xH_2O/OH^-$ (4) $FeCl_3 \cdot xH_2O$

53. The freezing point of a 10% aqueous solution by weight of X is same as the freezing point of another 20% aqueous solution by weight of Y. If molar mass of Y = 80 ; the molar mass of X is

(X and Y are non electrolytic solutes)

(1) 35.5 (2) 80

(3) 40 (4) 45.5

54. AB crystallizes as rock salt type crystal. If the distance between A^+ and B^- is 280 pm then the density of AB crystal is (At. mass of A = 40 and B = 16)

(1) 0.211 g/ml (2) 2.11 g/ml

(3) 4.22 g/ml (4) 0.422 g/ml

55. Which of the following aqueous solutions has highest vapour pressure?

(1) 0.02 M glucose at 20°C

(2) 0.005 M $MgCl_2$ at 15°C

(3) 0.05 M KCl at 60°C

(4) 0.005 M $MgCl_2$ at 60°C

56. The elevation in boiling point for 18.0 g of urea dissolved in 1 kg of water as solvent will be (K_b = 0.52 K kg mol^{-1}, molar mass of urea = 60 g/ mol)

(1) 1.56 (2) 0.156

(3) 0.3 (4) 0.03

57. The molality of 19.6% w/w H_2SO_4 aqueous solution is

(1) 1.8 m (2) 1.2 m

(3) 0.8 m (4) 2.5 m

58. For a weak electrolyte A_2B_3, where A is trivalent cation and B is divalent anion, if the degree of dissociation is 'α' then van't Hoff factor is given as

(1) $4 + \alpha$

(2) $1 + 4\alpha$

(3) $1 + 2\alpha$

(4) $1 + \alpha$

59. The rate of formation of B $\left(\frac{d[B]}{dt}\right)$ is the following reaction with respect to A is

$3A \rightarrow 2B$

(1) $\frac{-3}{2}\frac{d[A]}{dt}$ (2) $\frac{-1}{2}\frac{d[A]}{dt}$

(3) $\frac{-1}{3}\frac{d[A]}{dt}$ (4) $\frac{-2}{3}\frac{d[A]}{dt}$

60. The rate constant of a reaction A → B is 6×10^{-2} per second. If the initial concentration of A is 5 M, then the half life of the reaction (in seconds) is

(1) 1.15 (2) 4.16

(3) 41.66 (4) 11.55

61. 6 g of urea is dissolved in 9.9 moles of water. If vapour pressure of pure water is p°, then the vapour pressure of solution is

(1) 1.1 p° (2) 0.09 p°

(3) 0.99 p° (4) 0.1 p°

62. The packing fraction of body centered cubic unit cell is

(1) 0.68 (2) 0.74

(3) 0.54 (4) 0.58

63. The gas in tanks used by scuba divers of breathing contains

(1) 78% N_2 (2) 11.7% He

(3) 32.1% O_2 (4) Both (2) & (3)

64. In a compound, atoms of element A form ccp lattice and those of element B occupy all tetrahedral voids. The formula of the compound will be

(1) AB

(2) A_3B_2

(3) AB_2

(4) A_2B_3

65. The correct order of coagulating power of the following ions is

(1) $PO_4^{3-} > [Fe(CN)_6]^{4-} > SO_4^{2-}$

(2) $[Fe(CN)_6]^{4-} > PO_4^{3-} > SO_4^{2-}$

(3) $SO_4^{2-} > PO_4^{3-} > [Fe(CN)_6]^{4-}$

(4) $SO_4^{2-} > [Fe(CN)_6]^{4-} > PO_4^{3-}$

66. The incorrect statement for enzymes is

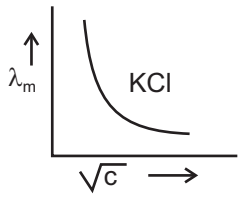
(1) These are highly specific in nature

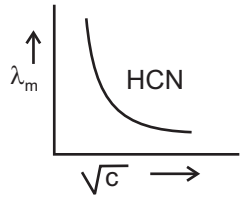
(2) Co-enzyme increases the enzymatic activity

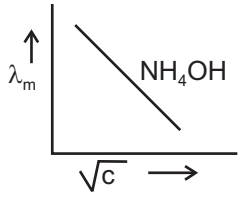
(3) These cannot be synthesised in the laboratory

(4) Numerous reaction of life process are catalysed by enzymes

67. Which of the following graph(s) is/are correct?

(1) 

(2) 

(3) 

(4) Both (1) and (3)

68. The incorrect statement for electrolytic cell is

(1) It converts electrical energy into chemical energy.

(2) For electrolytic cell $\Delta G < 0$.

(3) Electrical energy is supplied to conduct redox change.

(4) Electroplating is done by electrolytic cell.

69. The standard reduction potential of some elements are given

(a) $Pb^{2+}/Pb = -0.13$ V (b) $Fe^{2+}/Fe = -0.44$ V

(c) $Cu^{2+}/Cu = 0.34$ V (d) $Hg^{2+}/Hg = 0.92$ V

The elements which will release H_2 gas on reaction with acid are

(1) a, b and c (2) a and b

(3) a and c (4) b, c and d

70. The equivalent conductivity of Na_2SO_4 will be (if ionic conductance of Na^+ and SO_4^{2-} are a and b S cm^2 mol^{-1})

(1) $2a + \frac{b}{2}$ (2) a + b

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

71. Which of the following is a primary cell?

(1) Dry cell (2) Lead storage cell

(3) Nickel-Cadmium cell (4) Fuel cell

72. If 70% of a first order reaction was completed in 52 minutes, 50% of the same reaction would be completed in approximately (log 3 = 0.47)

(1) 30 minutes (2) 42 minutes

(3) 40 minutes (4) 52 minutes

73. If Zn^{2+} ions lying on one of the body diagonals of ZnS (sphalerite) unit cell are removed, the ratio of cation and anion would become

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

(3) 7 : 8 (4) 8 : 7

74. In cubic crystal system, which of the following variation is not possible?

(1) End-centered (2) Face-centered

(3) Body-centered (4) Primitive

75. For the equation $\log k = 5 - \frac{2000}{T}$,

The incorrect statement is

(1) The rate constant will increase with increase of temperature

(2) The graph of log k vs $\frac{1}{T}$ will have a negative slope

(3) The value of activation energy is – 2000/T for the reaction

(4) Both (1) and (3)

76. A solution containing 36 g per dm^3 of glucose is isotonic with a 3% (w/v) solution of a non-volatile and non-electrolyte solute. The molar mass of solute is

(1) 200 g mol^{-1} (2) 150 g mol^{-1}

(3) 20 g mol^{-1} (4) 15 g mol^{-1}

77. How much electricity is required to produce 5.4 g of Al from Al_2O_3.

(1) 0.6 F (2) 1.2 F

(3) 3 F (4) 6 F

78. A 0.1 molal aqueous solution of a weak monobasic acid is 40% ionized. The freezing point of the solution will be ($K_{f\,(water)}$ = 1.86°K/m)

(1) 0.58°C (2) – 0.46°C

(3) – 0.38°C (4) – 0.26°C

79. The values of resistance and resistivity of 0.1 M solution of an electrolyte are 50 Ω and 77 Ω cm respectively. The molar conductivity of the solution is

(1) 158 S cm^2 mol^{-1} (2) 130 S cm^2 mol^{-1}

(3) 105 S cm^2 mol^{-1} (4) 50 S cm^2 mol^{-1}

80. The number of electrons supplied at the cathode during electrolysis by a current of 2 ampere in 2 minutes is (charge of electron = 1.6×10^{-19} C)

(1) 6.02×10^{23} (2) 1.5×10^{20}

(3) 0.15×10^{22} (4) 0.6×10^{20}

81. A reaction is first order with respect to a gaseous reactant A and second order with respect to a gaseous reactant B. If volume of the mixture is doubled, the rate of reaction becomes

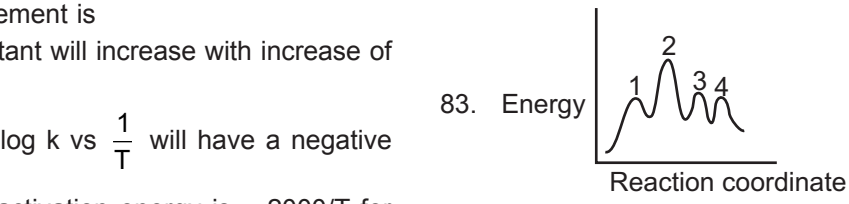
(1) $\frac{1}{8}$th times (2) 8 times

(3) $\frac{1}{4}$th times (4) 4 times

82. The standard reduction potential values of three metallic cations of X, Y and Z are 0.5, –1.5 and –2.1 V respectively. The order of oxidizing power will be

(1) X > Y > Z (2) Z > X > Y

(3) Y > Z > X (4) Z > Y > X

83. 

For the given energy profile diagram, rate determining step is

(1) 1 (2) 2

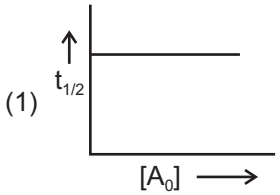
(3) 3 (4) 4

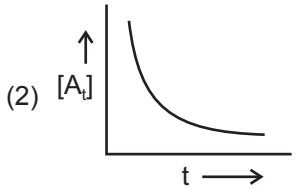
84. If the unit of rate and rate constant are same for a reaction, the order of reaction will be

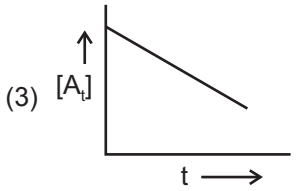
(1) Zero (2) 1

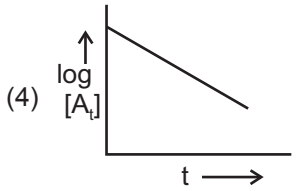
(3) 2 (4) 3

85. For a first order reaction the incorrect representation is

(1) 

(2) 

(3) 

(4) 

86. During electrolysis of dilute H_2SO_4, the gas evolved at anode is

(1) H_2 (2) O_2

(3) SO_2 (4) SO_3

87. The reaction which carried out in the presence of homogeneous catalyst is

(1) Manufacturing of sulphur trioxide from Chamber's process

(2) Manufacturing of nitric acid from Ostwald's process

(3) Manufacturing of ammonia from Haber's process

(4) Manufacturing of hydrogen from Bosch's process

88. Soap lather is an example of
(1) Sol
(2) Aerosol
(3) Emulsion
(4) Foam

89. For Freundlich adsorption isotherm the graph of log x/m vs log P, the slope has a value of
(1) 1.5
(2) 0 to 1
(3) 2
(4) 2 to 3

90. Which of the following cannot be a rock salt type crystal?
(1) AgBr
(2) AgI
(3) FeO
(4) KBr

BOTANY

91. Select the feature which is **not** true for asexual reproduction.
(1) Involvement of only one parent
(2) It can occur with or without gametic fusion
(3) It is simple and quick method of reproduction
(4) It occurs through specialised or unspecialised parts of parent

92. In *Amoeba* binary fission is a process in which
(1) Karyokinesis is followed by cytokinesis
(2) Nucleus is divided into many daughter nuclei
(3) The resulting daughter cells do not resemble with their parents
(4) Only cytoplasm divides

93. Breaking of offsets help in vegetative propagation. These offsets are
(1) Underground stems
(2) Modified roots
(3) Subaerial stems
(4) Adventitious buds

94. A mature typical anther is
(1) Tetrasporangiate (2) Trigonal
(3) Bisporangiate (4) Unisporangiate

95. Pollen viability is about thirty minutes in
(1) Wheat (2) Pea
(3) Gram (4) Potato

96. In angiosperms, the parenchymatous mass of tissue enclosed within the integuments and forms the body of ovule is called
(1) Chalaza (2) Funicle
(3) Embryo sac (4) Nucellus

97. Which of the following is a disadvantage of cleistogamy?
(1) The offsprings produced have limited genetic diversity
(2) It needs to produce a lot of pollen grains
(3) There is a little probability of flower to get pollinated
(4) There is always a need of pollinator

98. Consider the following statements and choose the appropriate option.
(i) The genetic constitution of a plant is affected in vegetative propagation.
(ii) Rhizome in ginger serves as vegetative propagule.
(1) Both the statements are correct
(2) Both the statements are incorrect
(3) Only statement (i) is correct
(4) Only statement (ii) is correct

99. Select the **correct** statement w.r.t. seeds of angiosperms.
(1) It can be the product of sexual reproduction or apomixis
(2) *Phoenix dactylifera* seed remains viable for few hours only
(3) Mature seeds always have endosperms
(4) Endosperm gives protection to the seeds

100. After culturing the anther of a plant, few diploid plants were found along with haploid plants. The diploid plants could have developed from
(1) Generative cell of pollen
(2) Cells of anther wall
(3) Vegetative cell of pollen
(4) Exine of pollen wall

101. During embryogeny in dicot plants, the zygote first divides into two unequal cells in which
(1) Larger suspensor cell lies towards micropyle
(2) Smaller suspensor cell lies towards micropyle
(3) Larger embryonal cell lies towards antipodal region
(4) Larger suspensor cells lies towards antipodal region

102. Appearance of vegetative propagules from the nodes of plants such as banana and ginger is mainly because
(1) Nodes are shorter than internodes
(2) Nodes have non-meristematic cells
(3) Nodes have non-photosynthetic cells
(4) Nodes have meristematic cells

103. Match the following columns and select the **correct** option.

	Column I		**Column II**
a.	*Bombax*	(i)	Entomophily
b.	*Calotropis*	(ii)	Ornithophily
c.	*Santalum*	(iii)	Hypohydrophily
d.	*Zostera*	(iv)	Ophiophily

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

104. Select the **odd** one w.r.t. post-fertilization changes.
(1) Ovule $\rightarrow$ Seed
(2) Integument $\rightarrow$ Seed coat
(3) Megaspore $\rightarrow$ Embryosac
(4) Zygote $\rightarrow$ Embryo

105. Middle layer of anther wall
(a) Degenerates at maturity
(b) Has water resistant fibrous bands
(c) Nourishes developing pollen grains
(d) Helps in dehiscence of anther due to its hygroscopic nature
(e) Is polyploid
The **correct** one(s) is/are
(1) (a), (d) & (e) (2) (a), (b) & (e)
(3) All except (b) (4) Only (a)

106. Which one of the following arrangements is **correct** w.r.t lifespans?
(1) Fruitfly < Crow < Parrot
(2) Rice < Banana < Rose
(3) Rose > Peepal > Banyan
(4) Cow > Crow > Tortoise

107. Cryopreservation is the
(a) Storage of pollen grains in dry ice.
(b) Fossilization of pollen grains.
(c) Storage of pollen grains in liquid N_2 for various artificial plant breeding programmes.
(1) Only (a) is correct (2) (b) & (c) are correct
(3) (a) & (c) are correct (4) Only (c) is correct

108. In angiosperms, for the formation of 12 three-celled male gametophytes from microspore mother cells, how many meiotic and mitotic divisions are required respectively?
(1) 3 and 24 (2) 5 and 12
(3) 3 and 1 (4) 5 and 20

109. Leaves have vegetative buds that help in vegetative reproduction in
(1) Pineapple (2) *Begonia*
(3) Ginger (4) Sugarcane

110. A maize plant has
(1) Both pistilate and staminate flowers
(2) Bisexual flowers
(3) Either pistilate or staminate flowers
(4) Only pistilate flowers

111. Select the **incorrect** statements from the following.
(a) In pteridophytes, water is the medium for gamete transfer
(b) In all seed plants, male gametes are motile and female gametes are non-motile
(c) In *Chara*, globule occupies upper position than the nucule
(d) *Marchantia* is a dioecious bryophyte
(1) (a), (c) and (d) (2) (b) and (d)
(3) (b) and (c) (4) (a) and (c)

112. Internal fertilisation occurs in all of the following organisms, **except**
(1) *Ulothrix* (2) *Cycas*
(3) *Spirogyra* (4) Maize

113. An ovary may have a single ovule as in $\underline{\text{(i)}}$ or many ovules as in $\underline{\text{(ii)}}$.
Select the **correct** option to fill the blanks (i) and (ii).
(1) (i) - Mango, (ii) - Wheat
(2) (i) - Rice, (ii) - Mango
(3) (i) - Mango, (ii) - Orchid
(4) (i) - Orchid, (ii) - Papaya

114. The most common type of ovule found in flowering plants is
(1) Orthotropous (2) Amphitropus
(3) Anatropous (4) Hemianatropous

115. In angiosperms, the megaspore mother cell is generally differentiated from
(1) Haploid cell of hilum
(2) Diploid cell of nucellus
(3) Diploid cell of stigma
(4) Haploid cell of nucellus

116. Select the **incorrect** match.
(1) Cotton - Free nuclear endosperm development
(2) Barley - Albuminous seed
(3) Rice - Cellulosic endosperm
(4) Betal nut - Stony endosperm

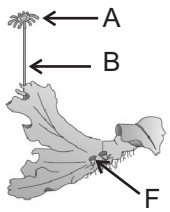
117. When the fusing gametes are morphologically similar they are known as isogametes. They are produced in
(1) *Fucus* (2) *Ulothrix*
(3) *Chara* (4) Bryophytes

118. Select the **correct** match w.r.t. asexual reproduction
(1) Bacteria – Bud formation
(2) *Planaria* – Oidia formation
(3) *Penicillium* – Conidia formation
(4) *Euglena* – Transverse binary fission

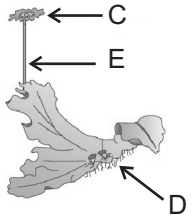
119. Both autogamy and geitonogamy are prevented by an outbreeding device in
(1) Maize (2) Coconut
(3) Papaya (4) Castor

120. The most common asexual spores produced in fungi are
(1) Wall-less and motile
(2) Produced endogenously
(3) Non-flagellated
(4) Thick walled, motile and formed exogenously

121. Select the **correct** option for the labellings shown below in the diagrams.



Female thallus



Male thallus

(1) A - Antheridiophore
E - Special branch
(2) B - Archegoniophore
F - Sexual structure
(3) D - Unicellular rhizoids
E - Antheridiophore
(4) C - Archegoniophore
F - Asexual structure

122. Select the **incorrect** match of vegetative propagule given in column I with the concerned plant mentioned in column II.

	Column I		**Column II**
(1)	Aerial shoot	–	*Opuntia*
(2)	Runner	–	Grass
(3)	Bulb	–	*Agave*
(4)	Offset	–	*Eichhornia*

123. In an angiospermic ovule, central cell of the embryo sac, prior to the entry of pollen tube, contains
(1) A single haploid nucleus
(2) One diploid and one haploid nuclei
(3) Two haploid polar nuclei
(4) One diploid secondary nuclei

124. Nature of endosperm in castor seeds is
(1) Starchy
(2) Oily
(3) Cellulosic
(4) Hemicellulosic

125. Which of the following statements about sporopollenin is **false**?
(1) Produced by tapetum and it constitutes exine layer
(2) It is one of the resistant organic materials
(3) Exine has apertures called germpores where sporopollenin is present
(4) It can withstand high temperatures and strong acids

126. Find **odd** one w.r.t. exalbuminous seeds.
(1) Groundnut (2) Pea
(3) Bean (4) Wheat

127. The hilum is a scar on the
(1) Fruit where it was attached to pedicle
(2) Fruit where style was present
(3) Seed where micropyle was present
(4) Seed where funicle was attached

128. Choose the **incorrect** match.

(1) Mango – Sporophytic budding

(2) Cashewnut – False fruit

(3) Banana – Parthenocarpic fruit

(4) Strawberry – True fruit

129. Identify the following as **true(T)** or **false(F)** and select the option accordingly.

A. Apple fruits develop without the process of fertilization.

B. The wall of ovary forms the wall of seed

C. False fruits do not have seeds.

	A	B	C
(1)	F	T	T
(2)	F	F	F
(3)	F	F	T
(4)	T	T	F

130. Seeds of black pepper and beet

(1) Lack seed coat

(2) Have persistent nucellus

(3) Lack embryo

(4) Are not covered within fruit wall

131. In the seeds of some grasses, there are remains of second cotyledon. It is called

(1) Coleorhiza (2) Epiblast

(3) Coleoptile (4) Radicle

132. Male gametes in angiosperms are released from pollen grains

(1) By breaking the outer walls

(2) After dissolving the outer walls

(3) By making pores in the cell wall

(4) Into pollen tube through germ pore

133. How many of the following characteristics of flowers favour pollination by insects?

Bright colour, Presence of nectaries, Non-sticky pollen grains, Feathery stigma, Foul-odour

(1) Three (2) Two

(3) Four (4) Five

134. Zygotic meiosis occurs in

(1) *Fucus*

(2) *Bambusa*

(3) *Cladophora*

(4) *Polygonum*

135. In the life cycle of a flowering plant, recovery phase is the part of

(1) Juvenile phase

(2) Reproductive phase

(3) Post-reproductive phase

(4) Senescent phase

ZOOLOGY

136. Read the following statements and select the **correct** option stating which statement is **true(T)** and which ones are **false(F)**.

(a) Clone are morphologically and genetically similar individuals.

(b) Lifespan of crow is 140 years.

(c) Formation of diploid zygote is universal in all sexually reproducing organisms.

(d) Embryonal protection and care are better in viviparous organisms w.r.t. oviparous organisms

	(a)	(b)	(c)	(d)
(1)	T	T	F	T
(2)	T	F	T	T
(3)	F	T	F	T
(4)	F	F	T	T

137. Select the type of parthenogenesis in which unfertilized eggs form only females.

(1) Epitoky

(2) Thelytoky

(3) Arrhenotoky

(4) Amphitoky

138. Complete the analogy and choose the **correct** option.

Euglena : Longitudinal binary fission :: *Planaria* :

(1) Transverse binary fission

(2) Simple binary fission

(3) Oblique binary fission

(4) Longitudinal binary fission

139. Read the following statement (A) and statement (B) carefully and choose the **correct** option.

Statement (A) : Lippe's loop is an effective contraceptive device.

Statement (B) : Lippe's loop is a barrier method which prevents the deposition of sperms into the vagina of female.

(1) Both the statements are correct

(2) Both the statements are incorrect

(3) Statement A is correct

(4) Statement B is correct

140. Secretion of milk is inhibited in a non-pregnant female by action of____ hormone.

Select the option which fills the blank **correctly.**

(1) PIH

(2) Dopamine

(3) Prolactin

(4) Both (1) and (2)

141. In which of the following animal testes remain permanently in the abdomen and does not cause any defect?

(1) Elephant (2) Bat

(3) Otter (4) Human

142. Mifipristone is

(1) Anti-estrogen

(2) Anti-progesterone

(3) Anti-androgen

(4) Anti-gonadotropin

143. Foetal ejection reflex triggers the release of

(1) Androgens from foetal pituitary

(2) Oxytocin from maternal pituitary

(3) Relaxin from foetal ovary

(4) Oxytocin from maternal adrenal glands

144. Maximum lifespan of crocodile is about

(1) 78 years (2) 28 years

(3) 60 years (4) 45 years

145. During gastrulation, ectoderm, endoderm and mesoderm of an embryo is derived from

(1) Trophoblast (2) Trophoectoderm

(3) Hypoblast (4) Epiblast

146. Oblique binary fission occurs in

(1) *Ceratium* (2) *Euglena*

(3) *Paramecium* (4) Diatoms

147. Choose the **incorrect** match.

(1) Testicular lobules in each testis – 250

(2) Mammary lobes in each breast – 15-20

(3) Sperm count in a healthy male per ejaculate – 200-300 million

(4) Number of primary follicles in each ovary at puberty – 6000-8000

148. Gemmules are asexual reproductive structures present in

(1) *Hydra*

(2) *Amoeba*

(3) *Spongilla*

(4) *Yeast*

149. Oocyte from ovary enters the oviduct by

(1) Beating action of the flagellum

(2) Ciliary movement of fimbriae

(3) Contraction of ovarian muscles

(4) Uterine contractions

150. Female reproductive hormone that inhibits FSH is

(1) hCG (2) Inhibin

(3) hPL (4) Relaxin

151. In human ovary, the structure which is formed after failure in fertilization is

(1) Corpus callosum

(2) Corpus hemorrhagicum

(3) Corpus albicans

(4) Corpus luteum

152. Interstitial cells produce testosterone under the influence of

(1) GH (2) LH

(3) hCG (4) FSH

153. The device which provides protection against STIs is

(1) Norplant (2) Gossypol

(3) Nirodh (4) Saheli

154. If the menstrual cycle of female is of 35 days then ovulation takes place on

(1) 30^{th} day (2) 16^{th} day

(3) 21^{st} day (4) 14^{th} day

155. The technique that involves fertilization of egg outside the female body, followed by its insertion into the oviduct is

(1) GIFT

(2) ZIFT

(3) AI

(4) IUI

156. Select the **incorrect** match w.r.t. sperm.

(1) Head – Has haploid nucleus

(2) Middle piece – Has mitochondria

(3) Tail – Has central axial filament

(4) Neck – Has nebenkern

157. Read the following statement (A) and statement (B) w.r.t. morula and choose the **correct** option.

Statement (A) : The embryo with 8-16 blastomeres is called morula.

Statement (B) : The size of morula in human is smaller than a fertilized egg.

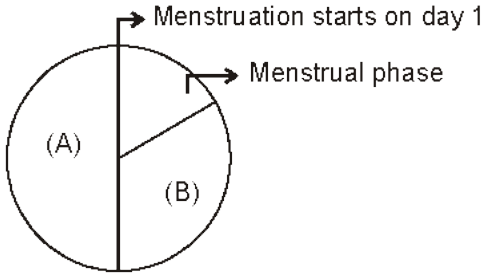
(1) Both the statements are correct

(2) Both the statements are incorrect

(3) Statement (B) is correct

(4) Statement (A) is correct

158. Following is a diagrammatic representation of menstrual cycle of 30 days. What will be the length of phase A and B, if menstrual phase is of 5 days?



Choose the **correct** option.

(1) A : 10 days, B : 15 days

(2) A : 14 days, B : 11 days

(3) A : 11 days, B : 14 days

(4) A : 15 days, B : 10 days

159. Which of the following association of germ layers and the developed tissue is **correct**?

(1) Adrenal cortex : Ectoderm

(2) Adrenal medulla : Mesoderm

(3) Gonads : Mesoderm

(4) Nervous system : Endoderm

160. Match the column I with column II and choose the **correct** match.

Column I	**Column II**
a. Menstrual phase	(i) Release of ovum
b. Follicular phase	(ii) Fully mature Graafian follicle
c. Ovulatory phase	(iii) Corpus luteum
d. Luteal phase	(iv) Breakdown of endometrium

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

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

161. Read the following statements.

(a) Parturition is induced by a complex neuroendocrine mechanism involving cortisol, estrogen and oxytocin.

(b) The opening of cervix is often covered partially by a membrane called hymen.

(c) Myometrium exhibits strong contraction during the delivery of the baby.

(d) Colostrum contains IgA, which provide passive immunity to the newborn.

How many given statement(s) are **correct**?

(1) One (2) Two

(3) Three (4) Four

162. In mammalian males, excretory and reproductive systems share

(1) Urethra (2) Seminal vesicle

(3) Vas deferens (4) Ureter

163. Choose the **odd** one w.r.t. asexual reproduction.

(1) Rapid mode of reproduction

(2) Biparental in nature

(3) Young ones are exact replicas of their parent

(4) Simpler than sexual reproduction

164. Select the **odd** one w.r.t ploidy.

(1) Primary spermatocytes

(2) Spermatids

(3) Secondary oocyte

(4) Ootid

165. Select the **odd** one w.r.t. mineralocorticoids.

(1) Stimulate the Na^+ reabsorption and K^+ excretion

(2) Mainly control carbohydrate metabolism

(3) Secreted by zona glomerulosa of adrenal cortex

(4) Secretion is under the control of renin-angiotensin system

166. Birth canal consist of _____ and _____ . Select the option which fill the blanks **correctly**.

(1) Vagina and uterus

(2) Vagina and cervix

(3) Cervix and hymen

(4) Vagina and hymen

167. The average number of children that can be born to a woman during her life time, is

(1) Total fertility rate

(2) Mortality rate

(3) Natality rate

(4) Birth rate

168. Arrange the following in increasing order of meiocyte (2n) number.

(a) Humans

(b) Housefly

(c) Rat

(d) Butterfly

(e) Dog

(1) (b), (c), (a), (e) & (d)

(2) (b), (a), (c), (e) & (d)

(3) (b), (a), (c), (d) & (e)

(4) (b), (e), (c), (a) & (d)

169. During tubectomy, if only one of the fallopian tube is cut and ligated, then

(1) Sterilization would still be successful

(2) Sterilization will not be successful

(3) Ova will reach at isthmus

(4) Sterilization cannot be reversed

170. Cryptorchidism is a condition in which testes do not descend into the scrotum. It is caused by

(1) Tearing of inguinal tissue

(2) Pulling action of gubernaculum

(3) Deficient secretion of testosterone

(4) Collection of fluid in tunica vaginalis

171. Which one is **not** natural contraceptive method?

(1) Safe period

(2) Coitus interruptus

(3) Barriers

(4) Lactational amenorrhoea

172. Which of the following can be a complication resulting from STIs due to delay in treatment?

(A) PID (B) Ectopic pregnancy

(C) Still births (D) Infertility

(1) Only (A) and (B)

(2) Only (A), (B) and (C)

(3) Only (C)

(4) (A), (B), (C) and (D)

173. How many eggs have been released if the mother gave birth to identical twins?

(1) 4 (2) 3

(3) 1 (4) 2

174. Implantation occurs at

(1) Zygote stage

(2) Morula stage

(3) Blastocyst stage

(4) Gastrula stage

175. Structure in female external genitalia which is homologous to male scrotum is

(1) Labia majora

(2) Labia minora

(3) Mons pubis

(4) Clitoris

176. Which of the following **cannot** be considered as method of contraception?

(1) Implants

(2) Sterilization

(3) IUI

(4) IUD

177. How many primary oocytes are required for the formation of 400 ovum?

(1) 200

(2) 400

(3) 100

(4) 50

178. All of the following are the reasons for infertility in males **except**

(1) Alcoholism

(2) Impotency

(3) Circumcision

(4) Gonadotropin deficiency

179. Read the following statements and choose the **incorrect** option.

(1) According to MTP Ammendment Act 2017, a pregnancy may be terminated on certain considered grounds within the first 12 weeks of pregnancy on the opinion of one registered medical practitioner.

(2) According to 2011 census report, the population growth rate of India was about 2% or 20/1000/ year

(3) Demographic transition occurs when birth rate exceeds death rate

(4) In a population, infants and older people have higher mortality rate than individuals of other age.

180. Which of the following is used as male contraceptive?

(1) Diaphragm (2) Gossypol

(3) Femshield (4) Saheli

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