

**TOPIC :**

**Physics** : Electrostatics

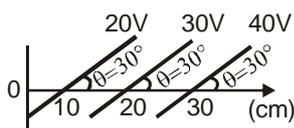
**Chemistry** : Chemical Kinetics, Nuclear Chemistry, Surface Chemistry (excluding colloids)

**Botany** : Criss-cross inheritance, Sex limited characters, sex influenced characters ; Mutations - non disjunction, Chromosomal aberrations

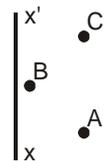
**Zoology** : MTP, Infertility & Sterility, ART

# PHYSICS

1. Some equipotential surfaces in the region are shown in the figure. The magnitude and direction of the electric field is



- (1) 100 V/m making angle  $120^\circ$  with the x-axis  
 (2) 100 V/m making angle  $60^\circ$  with the x-axis  
 (3) 200 V/m making angle  $120^\circ$  with the x-axis  
 (4) none of the above
2. If the potential in the region of space near the point  $(-2, 4, 6\text{m})$  is  $V = 80x^2 + 60y^2$  volt. Then components of electric field at that point are -
- (1)  $E_x = 0, E_y = 50 \text{ V/m}, E_z = 100 \text{ V/m}$   
 (2)  $E_x = 320 \text{ V/m}, E_y = -480 \text{ V/m}, E_z = 0$   
 (3)  $E_x = 100 \text{ V/m}, E_y = -240 \text{ V/m}, E_z = 0$   
 (4)  $E_x = 160 \text{ V/m}, E_y = 140 \text{ V/m}, E_z = 0$
3. The potential due to an infinite line charge  $xx'$  at a point A is 10 V and at the point B is 40 V. Points A and C are situated on the equipotential surface. The work done by the field in displacing an electron from -

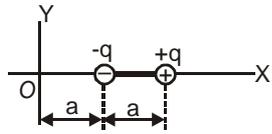


- (1) A to B is 30 eV  
 (2) B to C is 30 eV  
 (3) A to C is -30 eV  
 (4) A to B and from B to C is 30 eV
4. Two concentric spheres of radii R and r have similar charges with equal surface densities ( $\sigma$ ). What is the electric potential at their common centre

- (1)  $\sigma/\epsilon_0$                       (2)  $\frac{\sigma}{\epsilon_0}(R-r)$   
 (3)  $\frac{\sigma}{\epsilon_0}(R+r)$                 (4) none of the above
5. Two plastic rods of equal lengths ( $L = \pi R$ ) one of charge q and other of charge -q, form a circle of radius R in an xy plane. The charge is distributed uniformly on both rods. Then the magnitude of electric field at the centre of circle is-

- (1) zero                              (2)  $q/4\pi\epsilon_0 R^2$   
 (3)  $q/2\pi^2\epsilon_0 R^2$                 (4)  $q/\pi^2\epsilon_0 R^2$
6. Two charges equal in magnitude and opposite in polarity are placed at certain distance apart and force effective between them is F. If 75% charge of one is transferred to another, then the effective force between the charges becomes

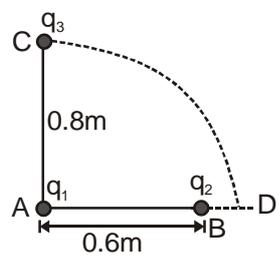
- (1)  $\frac{F}{16}$                               (2)  $\frac{9F}{16}$   
 (3) F                                  (4)  $\frac{15F}{16}$
7. Two equal and opposite charges  $-q$  and  $+q$  are fixed at the ends of a massless insulating rod of length a. It is placed along the X-axis as shown. In this region the electric field varies as  $E = K/x^2$  along the X-axis. Then the net force on the system is -



- (1) zero  
 (2)  $\frac{3Kq}{4a^2}$  towards origin  
 (3)  $\frac{3Kq}{a^2}$  away from origin  
 (4)  $\frac{Kq}{2.25a^2}$  away from origin

8. A ring of radius R carries a uniformly distributed charge +Q. A point charge  $-q$  is placed on the axis of the ring at a distance 2R from the centre of the ring and released from rest, then point charge
- (1) executes a simple harmonic motion (SHM) along the axis of the ring  
 (2) move to the centre of the ring and remains at rest there  
 (3) executes oscillatory motion but not SHM  
 (4) moves through the centre of the ring to infinity along the axis

9. Three charges  $q_1 = 20\text{nC}$ ,  $q_2 = -4\text{nC}$  and  $q_3 = 2\text{nC}$  are placed as shown. The charge  $q_3$  is taken from C to D along the arc of radius 0.8 m ( $AC = 0.8\text{m}$  and  $AB = 0.6\text{m}$ ). Then the potential energy of  $q_3$



- (1) does not change  
 (2) decreases by about 76%  
 (3) decreases by about 36%  
 (4) increases by about 76%

10. A large flat metal surface has a uniform charge density  $+\sigma$ . An electron of mass  $m$  and charge  $e$  leaves the surface normally at point A with speed  $u$ , and reaches the point B for momentarily at rest. Disregard gravity. The value of AB is -

(1)  $\frac{u^2 m \epsilon_0}{\sigma e}$                       (2)  $\frac{u^2 e \epsilon_0}{m \sigma}$   
 (3)  $\frac{u^2 e}{\epsilon_0 \sigma m}$                       (4)  $\frac{u^2 \sigma e}{\epsilon_0 m}$

11. Two identical particles of same mass are having same magnitude of charge  $Q$ . One particle is initially at rest on a frictionless horizontal plane and the other particle is projected directly towards the first particle from a very large distance with a velocity  $v$ . The distance of closest approach of the particle will be

(1)  $\frac{1}{4\pi\epsilon_0} \frac{4Q^2}{mv^2}$                       (2)  $\frac{1}{4\pi\epsilon_0} \frac{2Q^2}{mv^2}$   
 (3)  $\frac{1}{4\pi\epsilon_0} \frac{Q^2}{m^2v^2}$                       (4)  $\frac{1}{4\pi\epsilon_0} \frac{4Q^2}{m^2v^2}$

12. Two point charges placed at a distance of 0.20 m in air repel each other with a certain force. When a dielectric slab of thickness 0.08m and dielectric constant  $K$  is introduced between these point charges, force of interaction becomes half of its previous value. Then  $K$  is nearly -

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

13. Two point charges  $(+Q)$  and  $(-2Q)$  are fixed on the X-axis at positions  $a$  and  $2a$  from origin respectively. At what positions on the axis, the resultant electric field is zero.

(1) Only  $x = \sqrt{2} a$                       (2) Only  $x = -\sqrt{2} a$   
 (3) Both  $x = \pm\sqrt{2} a$                       (4)  $x = \frac{3a}{2}$  only

14. An electric dipole is placed along the x-axis at the origin O. A point P is at a distance of 20 cm from this origin such that OP makes an angle  $\frac{\pi}{3}$  with the x-axis. If the electric field at P makes an angle  $\theta$  with the x-axis, the value of  $\theta$  would be

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

15. The work done to carry a charge of  $-5.0C$  from A to B is 10.0 J. The relation of potential between the two points and potential difference will be -

- (1) B is at higher potential than A by 2 volt.  
 (2) A is at higher potential than B by 2 volt.  
 (3) A has potential 50 volts greater than that of B.  
 (4) B has potential 50 volts greater than that of A.

16. A dipole of electric dipole moment  $\vec{p}$  is placed in a uniform electric field of strength  $\vec{E}$ . If  $\theta$  is the angle between positive directions of  $\vec{p}$  and  $\vec{E}$ , the potential energy of the electric dipole is maximum when  $\theta$  is

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

17. A pendulum bob of mass 0.08 kg and carrying a charge of  $4 \times 10^{-4}C$  is at rest in horizontal uniform electric field of 20,000 V/m. The tension in the thread of the pendulum is ( $g = 10 \text{ m/s}^2$ )

(1) 5.64 N                                      (2) 8.00 N  
 (3) 11.28 N                                      (4) 16.92 N

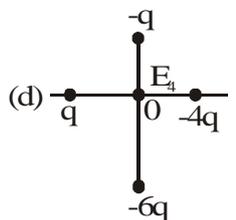
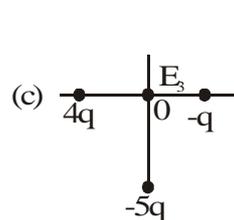
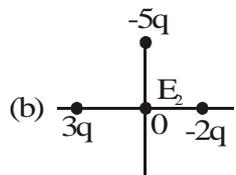
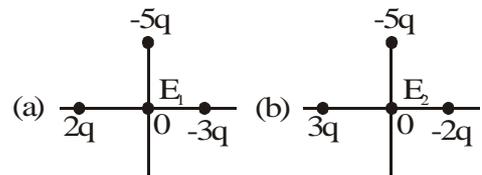
18. The insulation property of air breaks down at  $E = 3 \times 10^6$  volts per metre. The maximum charge that can be given to a sphere of radius 3 metres is approximately

(1)  $2 \times 10^{-2} C$                                       (2)  $3 \times 10^{-3} C$   
 (3)  $3 \times 10^{-4} C$                                       (4)  $2 \times 10^{-5} C$

19. Electric potential due to a non-conducting uniformly charged solid sphere of radius  $R$  at its surface is 75% of that at a distance  $r$  from its centre. Then  $r$  is

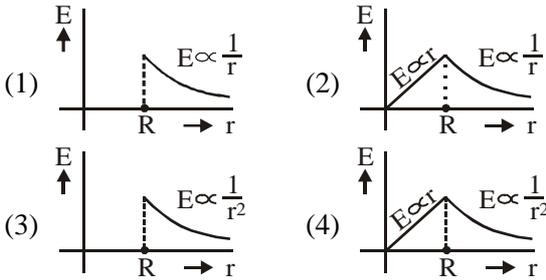
(1)  $\frac{R}{3}$                                       (2)  $\frac{R}{\sqrt{3}}$   
 (3)  $\frac{R}{2}$                                       (4)  $\frac{R}{\sqrt{2}}$

20. The figure shows four situations in which charged particles are at equal distances from the origin.  $E_1, E_2, E_3$  &  $E_4$  are the magnitudes of fields at origin in respective case. Then

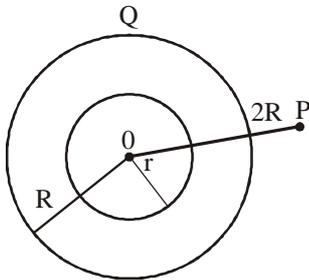


- (1)  $E_1 > E_2 > E_3 > E_4$                       (2)  $E_1 < E_2 < E_3 < E_4$   
 (3)  $E_1 = E_2 = E_3 = E_4$                       (4) None of these

21. For a uniformly charged non conducting solid sphere, which of the following graph shows the variation of  $E$  with  $r$ ? (distance from centre of sphere)



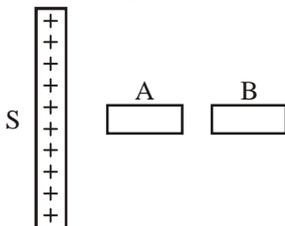
22. Two concentric hollow conducting spheres of radius  $r$  and  $R$  ( $R > r$ ) are shown. The charge on outer shell is  $Q$ . What charge should be given to inner sphere so that the potential at point 'P' outside the outer sphere at a distance  $2R$  from centre is zero?



- (1)  $-\frac{Qr}{R}$  (2)  $-\frac{QR}{r}$   
 (3)  $-Q$  (4)  $-\frac{2QR}{r}$
23. A charged particle moves with a speed  $v$  in a circular path of radius  $R$  around a long uniformly charged conductor under the effect of its electric field then

- (1)  $v \propto R$  (2)  $v \propto \frac{1}{R}$   
 (3)  $v \propto \frac{1}{\sqrt{R}}$  (4)  $v \propto R^0$

24. A large non conducting sheet  $S$  is given a uniform positive charge density. Two uncharged small metal plates  $A$  and  $B$  are placed near the sheet as shown. Which of the following is false?



- (1)  $S$  attracts  $A$  (2)  $S$  attracts  $B$   
 (3)  $A$  attracts  $B$  (4) None of these

25. A point charge causes an electric flux of  $-1.0 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$  to pass through a spherical Gaussian surface of  $10.0$  cm radius centred on the charge. If the radius of the Gaussian surface were doubled. How much flux would pass through the surface.

- (1)  $-10^3 \frac{\text{Nm}^2}{\text{C}}$  (2)  $-2 \times 10^3 \frac{\text{Nm}^2}{\text{C}}$   
 (3) Zero (4) None of these

26. The two charges  $7\mu\text{C}$  and  $-2\mu\text{C}$  are separated by a distance of  $18$  cm. The work required to separate the two charges infinitely away from each other is

- (1)  $0.7$  J (2)  $-0.7$  J  
 (3)  $1.4$  J (4)  $-1.4$  J

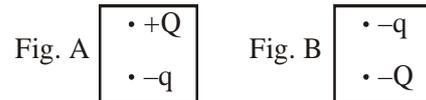
27. A positive point charge, which is free to move, is placed inside a negatively charged hollow conducting sphere, away from its centre. It will

- (1) Move towards centre  
 (2) Move towards the nearer wall of the conductor  
 (3) Remain stationary  
 (4) None of these

28. The minimum electrostatic force between two charged particles placed at a distance of  $1$  m is

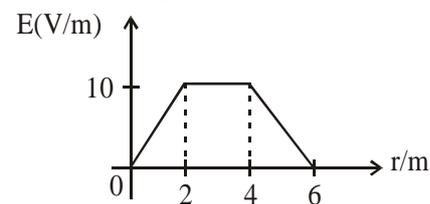
- (1)  $2.3 \times 10^{-28}$  N (2)  $6.2 \times 10^{-34}$  N  
 (3)  $1.02 \times 10^{-26}$  N (4)  $4.2 \times 10^{-27}$  N

29. In the following diagrams a particle with small charge  $-q$  is free to move up or down, but not sideways near a larger fixed charge  $Q$ . The small charge is in equilibrium because in the positions shown the electrical upward force is equal to the weight of the particle. Which statement is true?



- (1) In figure A,  $-q$  is in stable equilibrium  
 (2) In figure A,  $-q$  is neutral equilibrium  
 (3) In figure B,  $-q$  is in stable equilibrium  
 (4) Neither in figure A nor in B,  $-q$  is in stable equilibrium

30. The figure shows the variation of electric intensity  $E$  versus distance  $r$ . What is the potential difference between the point  $r = 2$  m &  $r = 6$  m



- (1)  $30$  V (2)  $60$  V  
 (3)  $-30$  V (4)  $-40$  V

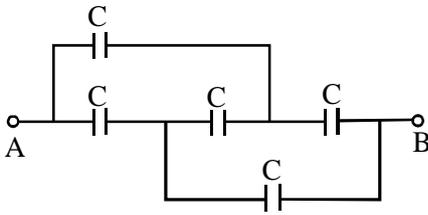
31. Sixty four drops are joined to form a bigger drop. If each drop has capacity 'C', Potential 'V' and charge 'q' then the capacity of the bigger drop will be

- (1) C (2) 4C  
(3) 16C (4) 64C

32. The capacitance of a parallel plate capacitor depends upon

- (1) The type of metal used  
(2) the thickness of the plates  
(3) The potential applied across the plates  
(4) The separation between the plates

33. What is the equivalent capacity of the combination between 'A' and 'B' ?



- (1) C (2) C/2  
(3) 2C (4) 4C

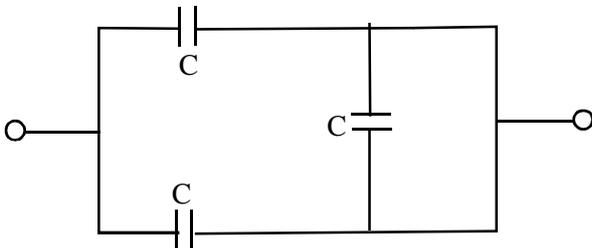
34. The capacitance of a capacitor will decrease if we introduce a slab of

- (1) Copper (2) Aluminium  
(3) Zinc (4) None of these

35. A parallel plate capacitor of plate area  $0.2\text{m}^2$  and spacing  $10^{-2}\text{m}$  is charged to  $10^3$  volt and is then disconnected from the battery. The work required, if the plates are pulled apart to double the plate spacing, is

- (1)  $8.85 \times 10^{-5} \text{ J}$  (2)  $10 \times 10^{-4} \text{ J}$   
(3) 10 J (4) 100 J

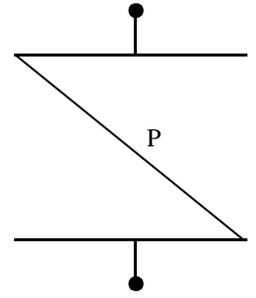
36. The equivalent capacitance of the combination shown in fig. is



- (1) C (2) 2C  
(3) C/2 (4) None of these

37. A thin metal plate P is inserted between the plates of a parallel-plate capacitor of capacitance C in such a way that its edges touch the two plates. The capacitance now becomes

- (1) C/2  
(2) 2C  
(3) 0  
(4)  $\infty$

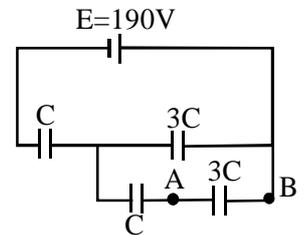


38. Three capacitors of capacitance  $6\mu\text{F}$  each are available. The minimum and maximum capacitances, which may be obtained are

- (1)  $6\mu\text{F}$ ,  $18\mu\text{F}$  (2)  $3\mu\text{F}$ ,  $12\mu\text{F}$   
(3)  $2\mu\text{F}$ ,  $12\mu\text{F}$  (4)  $2\mu\text{F}$ ,  $18\mu\text{F}$

39. In the circuit shown in figure potential difference between A and B is

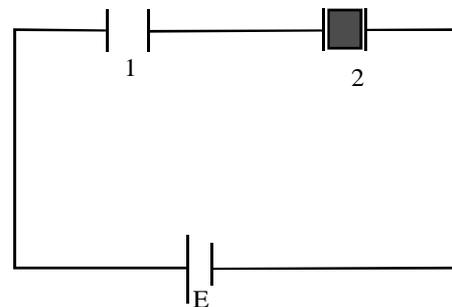
- (1) 30 V  
(2) 60 V  
(3) 10 V  
(4) 90 V



40. Two identical capacitors 1 and 2 are connected in series to a battery as shown in figure. Capacitor 2 contains a dielectric constant k as shown.  $Q_1$  and  $Q_2$  are the charges stored in the capacitors. Now the dielectric slab is removed and the corresponding charges are  $Q'_1$  and  $Q'_2$ . Then

(1)  $\frac{Q'_1}{Q_1} = \frac{k+1}{k}$  (2)  $\frac{Q'_2}{Q_2} = \frac{k+1}{2}$

(3)  $\frac{Q'_2}{Q_2} = \frac{k+1}{2k}$  (4)  $\frac{Q'_1}{Q_1} = \frac{k}{2}$





# CHEMISTRY

51. A reaction takes place in three steps; the rate constants are  $k_1$ ,  $k_2$  and  $k_3$ . The overall rate constant  $k = \frac{k_1 k_3}{k_2}$ . If energies of activation are 40, 30 and 20 kJ, the overall energy of activation is :
- (1) 10 (2) 15  
(3) 30 (4) 60
52. The reaction  $2\text{NO} + \text{Br}_2 \longrightarrow 2\text{NOBr}$  is supposed to follow the following mechanism
- $$\text{NO} + \text{Br}_2 \xrightarrow{\text{fast}} \text{NOBr}_2$$
- $$\text{NOBr}_2 + \text{NO} \xrightarrow{\text{slow}} 2\text{NOBr}$$
- What will be rate law equation
- (1)  $r = K [\text{NO}]^2 [\text{Br}_2]$  (2)  $r = K [\text{NO}] [\text{Br}_2]^2$   
(3)  $r = K [\text{NOBr}_2] [\text{Br}_2]$  (4)  $r = K [\text{NOBr}_2] [\text{NO}]$
53. What will be order of reaction in following rate expression  $r = K [\text{A}] [\text{B}]^{2/3}$ .
- (1) 1st order (2) 5/3  
(3) 2/3 (4) 2nd order
54. In a reaction  $2\text{A} \longrightarrow \text{P}$ ; Concentration of A decreases from 0.5 mol/lit to 0.4 mol/lit in 10 min. What will be rate during this reaction.
- (1) 0.1 M/min (2)  $\frac{10^{-2}}{2}$  M/min  
(3)  $10^{-2}$  M/min (4) 1 M/min
55. If  $a$  is the initial concentration, then time required to decompose 50% of  $a$  is inversely proportional to
- (1)  $a^n$  (2)  $a^{n-1}$   
(3)  $a^{1-n}$  (4)  $a^{-n}$
56. For following reaction, the rate law for  $S_N^1$  reactions will be
- $$\text{R}-\text{X} + \text{Nu}^- \longrightarrow \text{R}-\text{M}_4 + \text{X}^-$$
- (1) Rate =  $K[\text{R}-\text{X}] [\text{Nu}^-]$   
(2) Rate =  $K[\text{R}-\text{X}]$   
(3) Rate =  $K[\text{Nu}^-]$  (4) Rate =  $K$
57. What is the relation between  $t_{1/2}$  and  $t_{99.9\%}$
- (1)  $t_{99.9\%} = 10t_{1/2}$  (2)  $t_{99.9\%} = 2t_{1/2}$   
(3)  $t_{99.9\%} = 3t_{1/2}$  (4)  $t_{99.9\%} = 4t_{1/2}$
58. In an endothermic reactions, activation energy of backward reaction is  $10 \text{ kJ mol}^{-1}$  and enthalpy of reaction is  $5 \text{ kJ mol}^{-1}$ . What will be activation energy for forward reaction ?
- (1) 5 kJ (2) 20 kJ  
(3) 15 kJ (4) 25 kJ
59. Which of the following is of zero order reaction ?
- (1)  $2\text{N}_2\text{O}_5 \longrightarrow 4\text{NO}_2 + \text{O}_2$   
(2)  $\text{H}_2 + \text{Cl}_2 \xrightarrow{h\nu} 2\text{HCl}$   
(3)  $\text{H}_2 + \text{I}_2 \longrightarrow 2\text{HI}$   
(4)  $\text{CH}_3\text{COOCH}_3 + \text{H}_2\text{O} \longrightarrow \text{CH}_3\text{COOH} + \text{CH}_3\text{OH}$
60. All collisions are not effective to form product because
- (1) All don't have a proper orientation  
(2) All don't have a minimum required energy  
(3) All don't have any energy  
(4) Both (1) and (2)
61. Which of the following expression is correct ?
- (1) T.E. + Ea = K.E. (2) K.E. + T.E. = Ea  
(3) Ea + K.E. = T.E. (4) Any of these
62. Chlorophyll molecule in photosynthesis acts as
- (1) Reacting molecule (2) Photosensitizer  
(3) Reaction intermediate (4) The product
63. Which of the following may be a correct value of order of a reaction ?
- (1) -1 (2) 0  
(3)  $\frac{1}{2}$  (4) All of these
64. For a gaseous phase reaction,
- $$\text{A}_2(\text{g}) \longrightarrow \text{B}(\text{g}) + \frac{1}{2}\text{C}(\text{g});$$
- the increase in pressure from 100 mm to 120 mm is noticed in 5 minutes. The rate of disappearance of  $\text{A}_2$  in  $\text{mm min}^{-1}$  is:
- (1) 4 (2) 8  
(3) 16 (4) 2
65.  ${}_Z\text{X}^M + {}_2\text{He}^4 \longrightarrow {}_{15}\text{P}^{31} + {}_0n^1$  The value of Z and M will respectively be
- (1) 12 and 17 (2) 13 and 28  
(3) 12 and 27 (4) 13 and 27
66. What is the symbol for the nucleus remaining after  ${}_{20}\text{Ca}^{42}$  undergoes  $\beta$ -emission ?
- (1)  ${}_{21}\text{Ca}^{42}$  (2)  ${}_{20}\text{Sc}^{42}$   
(3)  ${}_{21}\text{Sc}^{42}$  (4)  ${}_{21}\text{Sc}^{41}$
67. Fill in the blanks  ${}_{92}\text{U}^{235} + {}_0n^1 \longrightarrow \dots + {}_{36}\text{Kr} + 3{}_0n^1$ :
- (1)  ${}_{56}\text{Ba}^{141}$  (2)  ${}_{56}\text{Ba}^{139}$   
(3)  ${}_{54}\text{Ba}^{139}$  (4)  ${}_{54}\text{Ba}^{141}$
68. 75% of a first order reaction was completed in 32 minutes. When was 50% of the reaction completed ?
- (1) 24 minutes (2) 16 minutes  
(3) 8 minutes (4) 4 minutes

69. Wooden artifact and freshly cut tree are disintegrated at a rate of 7.6 and 15.2  $\text{min}^{-1}\text{g}^{-1}$  of carbon ( $t_{1/2} = 5760$  years) respectively. The age of the artifact is

- (1) 5760 years (2)  $5760 \times \frac{15.2}{7.6}$  years  
 (3)  $5760 \times \frac{7.6}{15.2}$  years  
 (4)  $5760 \times (15.2 - 7.6)$  years

70. After 2 hours, the radioactive substance becomes 1/16th of original amount. The  $t_{1/2}$  in minutes is

- (1) 30 min (2) 60 min  
 (3) 75 min (4) 120 min

71. The radioisotope, tritium ( ${}^3\text{H}_1$ ) has a half-life of 12.3 years. If the initial amount of tritium is 32 mg. How many milligrams of it would remain after 49.2 years?

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

72.  $\text{X} \xrightarrow{-\alpha} \text{Y} \xrightarrow{-\beta} \text{Z} \xrightarrow{-\beta} \text{W}$  :

In the clove sequence of reactions, the elements which are isotopes of each other are

- (1) X and Y (2) X and Z  
 (3) X and W (4) None of these

73.  ${}_1\text{H}^2 + {}_1\text{H}^3 \longrightarrow {}_2\text{He}^4 + {}_0\text{n}^1$

The above nuclear reaction is called

- (1) Fission (2) Fusion  
 (3) Chemical (4) Autocatalytic

74. Which one of the following radioisotopes is used in the treatment of blood cancer?

- (1)  $\text{P}^{32}$  (2)  $\text{Co}^{60}$   
 (3)  $\text{I}^{131}$  (4)  $\text{Na}^{24}$

75. The half-life period of a radioactive element is 90 minutes. What percentage of radioactive element will be present after 6 hours of decomposition ?

- (1) 25% (2) 6.25%  
 (3) 12.5% (4) 50%

76. Given that a radioactive species decays according to the exponential law  $N_t = N_0 e^{-\lambda t}$ . The half-life of the process is

- (1)  $\lambda$  (2)  $N_0$   
 (3)  $\lambda / \ln 2$  (4)  $\ln 2 / \lambda$

77. The reactor used to convert fertile material to the fissile material is

- (1) Chemical reactor (2) Nuclear reactor  
 (3) Breeder reactor (4) Atomic reactor

78. An increase in the concentration of adsorbate at the surface relative to its concentration in bulk phase is called :

- (1) Adsorption (2) Sorption  
 (3) Absorption (4) Desorption

79. Modern theory of heterogeneous catalysis is :

- (1) Intermediate compound formation theory  
 (2) Adsorption theory  
 (3) A combination of two theories, i.e., intermediate compound formation and adsorption theory  
 (4) None of these

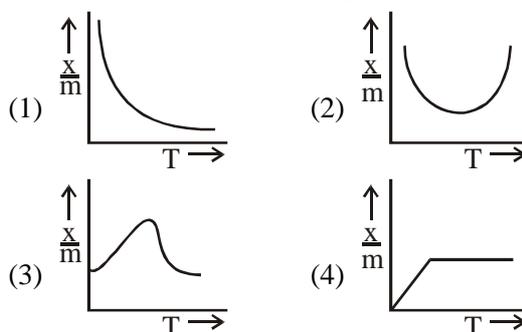
80. What is the equation form of Langmuir isotherm under high pressure?

- (1)  $\frac{x}{m} = \frac{a}{b}$  (2)  $\frac{x}{m} = aP$   
 (3)  $\frac{x}{m} = \frac{1}{aP}$  (4)  $\frac{x}{m} = \frac{b}{a}$

81. Adsorption is accompanied by :

- (1) Decrease in entropy of the system  
 (2) Decrease in enthalpy of the system  
 (3) Adsorption is accompanied with decreases in free energy  
 (4) All of these

82. Which plot is the adsorption isobar for chemisorption, where X is the amount of gas adsorbed on mass m (at constant pressure) at temperature T :



83. Which statement is correct ?

- (1) Physical adsorption is multi-layer, reversible and non-specific  
 (2) Chemical adsorption is unilayer  
 (3) Chemical adsorption is more stronger than physical adsorption  
 (4) All of these

84. Which equation represents Freundlich adsorption isotherm (physical adsorption is basis of this theory)?

- (1)  $\frac{x}{m} = K(P)^{1/n}$  ; where x is amount of gas adsorbed on mass 'm' at pressure P  
 (2)  $\log \frac{x}{m} = \log K + \frac{1}{n} \log P$

- (3)  $\frac{x}{m} = KP$  at low pressure and  $\frac{x}{m} = K$  at high pressure  
 (4) All of these
85. The amount of gas adsorbed physically on charcoal increases  
 (1) By increasing temperature and pressure  
 (2) By increasing temperature and decreasing pressure  
 (3) By increasing Pressure and decreases by increasing temperature  
 (4) None of these
86. Which characteristic of adsorption is wrong ?  
 (1) Physical adsorption in general decreases by increasing temperature  
 (2) Physical adsorption in general increases by increasing temperature  
 (3) Physical adsorption is a reversible process  
 (4) Adsorption is limited to the surface only
87. The extent of adsorption of a gas on a solid depends on:  
 (1) A nature of gas (2) Pressure of gas  
 (3) Temperature of the system  
 (4) All of these
88. Pd can adsorb 900 times its volume of hydrogen. This is called :  
 (1) Absorption (2) Adsorption  
 (3) Occlusion (4) Both (2) and (3)
89. The phenomenon in which adsorption and absorption takes place simultaneously is called:  
 (1) Desorption (2) Sorption  
 (3) Adsorption (4) Absorption
90. Which gas is adsorbed strongly by charcoal ?  
 (1) CO (2) N<sub>2</sub>  
 (3) H<sub>2</sub> (4) NH<sub>3</sub>
91. For the reaction  $N_2 + 3H_2 \rightarrow 2NH_3$   
 if  $\frac{\Delta[NH_3]}{\Delta t} = 2 \times 10^{-4} \text{ mol l}^{-1} \text{ s}^{-1}$ , the value of  $\frac{-\Delta[H_2]}{\Delta t}$  would be  
 (1)  $1 \times 10^{-4} \text{ mol l}^{-1} \text{ s}^{-1}$  (2)  $3 \times 10^{-4} \text{ mol l}^{-1} \text{ s}^{-1}$   
 (3)  $4 \times 10^{-4} \text{ mol l}^{-1} \text{ s}^{-1}$  (4)  $6 \times 10^{-4} \text{ mol l}^{-1} \text{ s}^{-1}$
92. The rate of a reaction is doubled for every 10° rise in temperature. The increase in reaction rate as a result of temperature rise from 10° to 100° is  
 (1) 112 (2) 512  
 (3) 400 (4) 614
93. The main function of a catalyst in speeding up a reaction is  
 (1) To increase the energy of the molecules of the reactants  
 (2) To change the reaction path so as to decrease the energy of activation for the reaction  
 (3) To reduce the temperature at which the reaction can occur  
 (4) All of these
94. In which of the following cases, does the reaction go farthest to completion  
 (1)  $K = 10^3$  (2)  $K = 10^{-2}$   
 (3)  $K = 10$  (4)  $K = 1$
95. The reaction  $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$  is of first order. If volume of reaction vessel is reduced to 1/3, the rate of reaction would be  
 (1) 1/3 times (2) 2/3 times  
 (3) 3 times (4) 6 times
96. A reaction involving two different reactants  
 (1) Can never be a second order reaction  
 (2) Can never be a unimolecular reaction  
 (3) Can never be a bimolecular reaction  
 (4) Can never be a first order reaction
97. Integrated velocity equation for first order reaction is  
 (1)  $[A]_0 = [A]e^{-Kt}$  (2)  $K = [A]_0 e^{-At}$   
 (3)  $Kt = 2.303 \log \frac{[A]_0}{[A]}$  (4)  $\log \frac{[A]_0}{[A]} = -2.303Kt$
98. The half life for the reaction  
 $N_2O_5 \rightleftharpoons 2NO_2 + \frac{1}{2}O_2$  in 24 hrs at 30°C. Starting with 10g of N<sub>2</sub>O<sub>5</sub> how many grams of N<sub>2</sub>O<sub>5</sub> will remain after a period of 96 hours  
 (1) 1.25g (2) 0.625g  
 (3) 1.77g (4) 0.5g
99. The thermal decomposition of a compound is of first order. If a sample of the compound decomposes 50% in 120 minutes, in what time will it undergo 90% decomposition  
 (1) Nearly 240 minutes (2) Nearly 480 minutes  
 (3) Nearly 450 minutes (4) Nearly 400 minutes
100. Half life of a reaction is found to be inversely proportional to the cube of its initial concentration. The order of reaction is  
 (1) 2 (2) 5  
 (3) 3 (4) 4

# BOTANY

101. Autosomal genes which express only in certain sex is  
(1) Sex determination trait  
(2) Sex limited trait  
(3) Sex linked trait (4) Holandric trait
102. Colour blindness is detected by using  
(1) X-cards (2) Fluorescent discs  
(3) Barr bodies (4) Ishihara cards
103. Find the odd one out :  
(1) TDF  
(2) Keratoderma dissipatum  
(3) Muscular dystrophy (4) Hypertrichosis
104. Type of sex linked inheritance in which mother gives the gene to her daughter is  
(1) Holoandric (2) Diagynic  
(3) Hologynic (4) Diandric
105. Deuteronomia refers to  
(1) Inability to see in darkness  
(2) Inability to perceive green colour  
(3) Inability to perceive red colour  
(4) Absence of eyes
106. Which of the following statements wrt inversion is incorrect ?  
(1) The chromosome segment gets inverted by  $180^\circ$   
(2) It inhibits chromosomal synapsis in the region of change  
(3) It is of simple and reciprocal types  
(4) It occurs in *Drosophila* upon x-ray exposure
107. The first chemical mutagen discovered by Auerbach was  
(1) Colchicine (2) LSD  
(3) Acridine (4) Mustard gas
108. 5-Bromouracil is a mutagen which acts as a  
(1) Base analogue of cytosine  
(2) Base analogue of thymine  
(3) Base analogue of uracil  
(4) Methylating agent
109. Pseudodominance is seen as a result of  
(1) Deletion (2) Inversion  
(3) Duplication (4) Translocation
110. If the sequence of genes on a chromosome is changed from a b c d e f g to abcdde f g it is a case of  
(1) Tandem duplication  
(2) Heterobrachial displacement  
(3) Transposition  
(4) Reverse tandem
111. In man translocation between 15 and 21 chromosomes may lead to  
(1) Down's syndrome (2) Philadelphia syndrome  
(3) Hunters syndrome (4) Cri du chat syndrome
112. Which of the following statements is incorrect  
(1) Homozygous deletion is often lethal  
(2) Heterozygous deletion can be known during zygotene  
(3) Homozygous deletion causes pseudodominance  
(4) Heterozygous deletion may show a loop during zygotene
113. Bar eye in *Drosophila* is a result of  
(1) Reciprocal translocation  
(2) Duplication  
(3) Simple translocation (4) Inversion
114. During evolution a reduction in chromosome number from 48 to 46 has resulted in evolution of man from apes. This is due to  
(1) Deletion of some genes  
(2) Tandem duplication  
(3) Whole arm translocation  
(4) Reverse tandem
115. Cri-du-chat (cry of the cat) syndrome occurs in human babies due to  
(1) Deletion (2) Duplication  
(3) Inversion (4) Simple translocation
116. The duplication segment gets inserted away from normal segment but on the same chromosome in case of  
(1) Tandem duplication  
(2) Reverse tandem duplication  
(3) Displaced duplication  
(4) Repeat duplication
117. In Burkitt's lymphoma translocation occurs between chromosomes  
(1) 9 and 22 (2) 8 and 14  
(3) 8 and 22 (4) 8 and 15
118. Terminal deletion in chromosome 4 causes  
(1) Tay Sach's syndrome  
(2) Cri du chat syndrome  
(3) Wolf Hirschhorn syndrome  
(4) Cystic fibrosis
119. Haemophilia A is caused due to absence of  
(1) Factor VIII (2) Factor IX  
(3) Factor VII (4) Factor XI

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120. Chronic myeloid leukaemia is related to
- (1) Philadelphia chromosome
  - (2) Duplication in chromosome 21
  - (3) Deletion in chromosome 9
  - (4) After effect of cystic fibrosis
121. Pattern baldness is expressed by autosomal genes and is considered
- (1) Sex linked recessive trait
  - (2) Sex linked dominant trait
  - (3) Sex limited trait
  - (4) Sex influenced trait
122. Human male is hemizygous for gene of
- (1) Sickle cell anaemia
  - (2) Pattern baldness
  - (3) Haemophilia
  - (4) Both (2) and (3)
123. Criss cross inheritance is shown by
- (1) X-linked inheritance
  - (2) Y-linked inheritance
  - (3) Sex influenced inheritance
  - (4) Sex limited inheritance
124. Translocation is a type of chromosomal aberration where
- (1) Parts of chromosome is exchanged between homologous chromosomes
  - (2) A part of one chromosome is exchanged between non-homologous counterpart
  - (3) A part of one chromosome is shifted to its homologous counterpart
  - (4) A parts of one chromosome is shifted to another part of the same chromosome
125. A colour blind girl is rare because she will be born only when
- (1) Her mother and maternal grandfather were colour blind
  - (2) Her father and maternal grandfather were colour blind
  - (3) Her mother is colour blind and father has normal vision
  - (4) Parents have normal vision but grandparents were colour blind
126. Colchicine interferes with
- (1) Chromosome replication
  - (2) Organisation of spindle
  - (3) Chromosome condensation
  - (4) Incorporation of nitrogen bases
127. In centromere is included in the region of region of Inversion, it is called
- (1) Inter Inversion
  - (2) Intra Inversion
  - (3) Paracentric Inversion
  - (4) Pericentric Inversion
128. Daughter of a colour blind father and normal mother marries a colour blind person. Colour blindness in the family shall be in
- (1) 50% sons and 50% daughters
  - (2) All sons and daughters
  - (3) All daughters
  - (4) All sons
129. In humans, Philadelphia chromosomes results from the reciprocal translocations between chromosome numbers
- (1) 20 and 9
  - (2) 9 and 20
  - (3) 3 and 11
  - (4) 9 and 22
130. Colchicine arrests cell division at
- (1) Prophase
  - (2) Metaphase
  - (3) Anaphase
  - (4) Telophase
131. Rearrangement of genes occurs due to
- (1) Translocation and duplication
  - (2) Translocation and deficiency
  - (3) Deletion and deficiency
  - (4) Translocation and inversion
132. X-ray induced mutations were introduced in maize for the first time by
- (1) Muller
  - (2) Stadler
  - (3) Morgan
  - (4) Singleton
133. Which is not a mutagen ?
- (1) Acetic acid
  - (2) Gamma rays
  - (3) Nitrous acid
  - (4) Acridine dyes
134. In which of the following type of sex-linkage, Reversal of dominance is possible?
- (1) Sex-linked inheritance
  - (2) Sex-influenced inheritance
  - (3) Sex-limited inheritance
  - (4) Y-linked inheritance
135. A colour blind man has a colour blind sister but normal brother. The phenotype of parents is
- (1) Normal father and colour blind mother
  - (2) Both parents are normal
  - (3) Both parents are colour blind
  - (4) Father colour blind and mother carrier
136. Mutations in plants are induced mostly by
- (1) UV radiations
  - (2) Beta rays
  - (3) Alpha rays
  - (4) Gamma rays
137. Genes located on differential region of Y-chromosome are called
- (1) XY linked genes
  - (2) Holandric genes
  - (3) Autosomal genes
  - (4) Mutant genes

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138. A woman with two genes, one for haemophilia and one for colour blindness on one of its X-chromosomes, marries a normal man. The progeny will be
- (1) All sons haemophilic and colour blind
  - (2) 50% haemophilic and colour blind sons and 50% normal sons
  - (3) All daughters haemophilic and colour blind
  - (4) 50% haemophilic daughter and 50% colour blind daughters
139. In *Drosophila*, white eye colour is recessive X-linked trait while red eye colour is dominant. A white eyed female is crossed with red eyed male. The female offspring with red eye colour would be
- (1) 100%
  - (2) 50%
  - (3) 25%
  - (4) Zero
140. Hypertrichosis or hairy ears is a character associated with the :
- (1) Y chromosome
  - (2) X chromosome
  - (3) XX chromosome
  - (4) XY chromosome
141. Eye colour in fruitfly is a sex linked trait and the cross between white eyed female and red eyed male gives red eyed females and white eyed males. Rarely this cross may give all white eye female and red eyed males, this was found to be due to
- (1) Loss of sex chromosome
  - (2) Non-disjunction of two X chromosomes in female fly
  - (3) Mutation in female fly
  - (4) Mutation in male fly
142. A colourblind girl is rare and can be born when :
- (1) Her father is colourblind and mother has normal vision but her mother's father (maternal grandfather) is colourblind
  - (2) Her mother is colourblind, even if father has normal vision
  - (3) Even when both her parents have normal vision provided the grand parents were colourblind
  - (4) Her mother is colourblind and her father had normal vision but her paternal grandfather (father's father) was colourblind
143. The gene for haemophilia is located on X-chromosome of humans. It is normally impossible for a:
- (1) Haemophilic father to pass the gene to his son
  - (2) Carrier mother to pass the gene to her son
  - (3) Haemophilic father to pass the gene to his daughter
  - (4) Carrier mother to pass the gene to her daughter
144. Sex-linked traits :
- (1) Are carried on an autosome but expressed only in males
  - (2) Are coded for by genes located on a X-chromosome
  - (3) Are found in only one or the other sex, depending on the sex-determination system of the species
  - (4) Are always inherited from the mother in mammals and fruit flies
145. If both parents of a male child are normal, what are the chances of the child being colourblind ?
- (1) It is impossible
  - (2) It is possible only if mother's father was colorblind
  - (3) It is possible only if father's mother was colourblind
  - (4) It is possible even when all the four grandparents had normal vision
146. Which one of the following is a sex-linked characteristic ?
- (1) White eye in *Drosophila*
  - (2) Duffy blood group in human
  - (3) AB blood group in human beings
  - (4) All of these
147. A diseased man marries a normal woman and they get three daughters and five sons. All the daughters were diseased and sons were normal. The gene of this disease is :
- (1) Sex-linked dominant
  - (2) Sex-linked recessive
  - (3) Sex-linked character
  - (4) Autosomal dominant
148. Ichthyosis is a
- (1) Sex-linked trait
  - (2) Sex-influenced trait
  - (3) Sex-limited trait
  - (4) Y-linked trait
149. Which one of the genes is present exclusively on the X chromosome in humans and is concerned with ?
- (1) Baldness
  - (2) Red-green colour blindness
  - (3) Facial hair/ moustaches in males
  - (4) Night blindness
150. The 'Christmas disease' patient lacks antihemophilic:
- (1) Haemogentistic acid oxidase
  - (2) Factor VIII
  - (3) Factor XI
  - (4) Factor IX

## ZOOLOGY

151. In which of the following technique under assisted reproductive technologies (ARTs) will not involve *in vitro* fertilisation ?
- (1) Test tube baby programme
  - (2) ZIFT
  - (3) ICSI
  - (4) GIFT
152. Which of the following can be taken as the complications of sexually transmitted diseases ?
- (1) Pelvic inflammatory diseases (PIDs)
  - (2) Still birth
  - (3) Infertility
  - (4) All of these
153. If a person is suffering from excessive decrease in sperm count or no sperm motility, which of the following technique will help the couple as an alternative to using donor sperm for IVF ?
- (1) IUT
  - (2) ICSI
  - (3) GIFT
  - (4) ZIFT
154. Which of the following sexually transmitted disease (STDs) is not a viral disease?
- (1) Genital herpes
  - (2) Chancroid
  - (3) AIDS
  - (4) Hepatitis
155. Which of the following method is used for the detection of syphilis ?
- (1) DNA-DNA hybridisation - PCR
  - (2) Antibody detection - VDRL
  - (3) Electron microscopy of culture
  - (4) By gram staining of biopsy
156. Which of following statement about AIDS virus is incorrect ?
- (1) AIDS virus is RNA virus
  - (2) AIDS virus has a single copy of RNA surrounded by phospholipid bilayer and protein coat
  - (3) AZT is most commonly used drug to treat AIDS
  - (4) AIDS virus mostly attacks T<sub>4</sub> cells
157. Absence of sperm motility is
- (1) Azoospermia
  - (2) Asthenozoospermia
  - (3) Teratozoospermia
  - (4) Oligozoospermia
158. Which of the following is not a reason for infertility in females
- (1) Gonadotropin deficiency
  - (2) Anovulatory cycle
  - (3) Salpingitis
  - (4) Orchitis
159. MTP is considered safe for the first ..... weeks of pregnancy
- (1) 10
  - (2) 15
  - (3) 8
  - (4) 12
160. Which of the following statement is false
- (1) WHO has defined reproductive health as a total well being in physical, emotional, behavioral & social aspects of reproduction
  - (2) HIV infects both males as well as females
  - (3) Family planning was initiated in 1951 in India
  - (4) None of these
161. Syphilis is caused by
- (1) *Neisseria gonorrhoeae*
  - (2) *Treponema pallidum*
  - (3) *Trichomonas vaginalis*
  - (4) *Chlamydia trachomatis*
162. Which of the following is not a type of assisted reproductive technology
- (1) GIFT
  - (2) MTP
  - (3) ICSI
  - (4) ZIFT
163. The technique in which sperm is directly injected into egg is
- (1) ICSI
  - (2) IUI
  - (3) IVF
  - (4) ART
164. Which of the following is not a cause of infertility in males
- (1) Varicocele
  - (2) Hydrocoel
  - (3) Endometriosis
  - (4) Orchitis
165. Govt. of India legalised MTP in
- (1) 1971
  - (2) 1981
  - (3) 1991
  - (4) 1976
166. MTP law in India specifies
- (1) The grounds on which pregnancy may be terminated
  - (2) The persons who are permitted to perform this procedure
  - (3) The place where such terminations can be performed
  - (4) All of these

167. In vitro fertilization can be used
- (1) To acquire zygotes with desired genetic characteristics for experimental purpose
  - (2) To increase the population of rare and endangered species & expensive animal breeds
  - (3) To study early embryonic development
  - (4) All of these
168. A surgery to restore patency of obstructed fallopian tubes is
- (1) Tuboplasty
  - (2) Salpingectomy
  - (3) Tubectomy
  - (4) Artificial insemination
169. A technique in which a mixture of sperms and eggs is placed directly into a woman's fallopian tubes using laparoscopy is
- (1) ZIFT
  - (2) GIFT
  - (3) MESA
  - (4) IUI
170. A process whereby a small needle is inserted through the back of vagina used guided via ultrasound into the ovarian follicles to collect the fluid that contains eggs is
- (1) Assisted zona hatching (AZH)
  - (2) Intracytoplasmic sperm injection (ICSI)
  - (3) Transvaginal ovum retrieval (TVOR)
  - (4) Preimplantation genetic diagnosis (PGD)
171. All of the following are causes of infertility except
- (1) Uterine fibroids
  - (2) Precocious puberty
  - (3) Endometriosis
  - (4) Insulin Resistance
172. What is the optimum number of embryos implanted during IVF ?
- (1) One to three
  - (2) Two to four
  - (3) Five to six
  - (4) More than six
173. What is the most common ART procedure ?
- (1) IVF
  - (2) GIFT
  - (3) ZIFT
  - (4) None of these
174. Which of the following procedures is non-surgical ?
- (1) IVF
  - (2) ICSI
  - (3) IUI
  - (4) ZIFT
175. MESA technique is for :
- (1) Injection of spermatozoa into fallopian tubes
  - (2) Taking out spermatozoa from epididymis
  - (3) Introduction of embryos into uterus
  - (4) Freezing of embryos
176. Medical terminal of pregnancy (MTP) is done to get rid of unwanted pregnancies due to
- (1) Casual unprotected intercourse
  - (2) Failure of contraceptive used during coitus
  - (3) Rape forced sexual intercourse
  - (4) All of these
177. Presence of abnormal sperm morphology in semen is
- (1) Oligozoospermia
  - (2) Azoospermia
  - (3) Teratozoospermia
  - (4) Asthenozoospermia
178. Causative agent for gonorrhoeae is
- (1) *Neisseria gonorrhoeae*
  - (2) *Treponema pallidum*
  - (3) *Hepatitis virus*
  - (4) *Trichomonas vaginalis*
179. Which of the following STD is completely curable
- (1) Trichomoniasis
  - (2) Gonorrhoea
  - (3) Chlamydia
  - (4) All of these
180. First test tube baby born in England was
- (1) Louise Joy Brown
  - (2) Kum. Harsha
  - (3) Baby Durga
  - (4) None of these
181. Which of the following statement is false
- (1) Among STDs, HIV infection is most dangerous
  - (2) Success rate of test tube baby programmes is very high
  - (3) Amniocentesis is a very useful technique
  - (4) Success rate of IUI is nearly same as that of natural coitus
182. HIV doesn't spread through
- (1) Sharing of injection needles with infected person
  - (2) Transfusion of blood
  - (3) Mosquito bites
  - (4) An infected mother to foetus
183. Incidence of STDs is very high among individuals of age group
- (1) 8-12 years
  - (2) 15-24 years
  - (3) 35-45 years
  - (4) 55-65 years
184. A woman who agrees to be impregnated with another woman's fertilized egg and give birth to a child who will be raised by others, whether or not in exchange for compensation
- (1) Traditional Surrogate
  - (2) Gestational Surrogate
  - (3) Gestational Mother
  - (4) Gestational Carrier

185. Which of the following is not a reason for infertility in males
- (1) GnRH deficiency
  - (2) Testosterone imbalance
  - (3) Prolactin imbalance
  - (4) Salpingitis
186. Semen sample from a normal healthy adult male shows following parameters on an average
- (1) Volume : 3 to 5 ml/ejaculate
  - (2) pH : 7.4
  - (3) Sperm count : 60 to 80 million/ml
  - (4) All of these
187. Which of the following statement is true
- (1) Creating awareness about sex related aspects is an effective method to improve reproductive health of people
  - (2) Infertility is always due to abnormalities/defects in female
  - (3) Surrogate mother should be genetically related to the child
  - (4) None of these
188. Absence of spermatozoa in semen is
- (1) Oligospermia
  - (2) Teratozoospermia
  - (3) Asthenozoospermia
  - (4) Azoospermia
189. The test tube baby Kum Harsha was produced by doctor
- (1) Sadhna Desai
  - (2) Abha Mazumdaar
  - (3) Indira Hinduja
  - (4) Harsha Malhotra
190. Human Papilloma Virus causes
- (1) Hepatitis-B
  - (2) Trichomoniasis
  - (3) Chlamydia
  - (4) Genital Herpes
191. Which of the following statement is true w.r.t AIDS
- (1) AIDS was first noticed in USA in 1981
  - (2) In AIDS there is reduction in number of helper-T-cells
  - (3) Coughing & Sneezing doesn't spread AIDS
  - (4) All of these
192. Which of the following is second stage of symptoms of syphilis
- (1) Appearance of a painless lesion called chancre at the site of entry of organism
  - (2) Appearance of flulike illness, skin rash, hair loss, swollen joints
  - (3) Permanent brain damage, heart disease
  - (4) Discharge of pus as excessive vaginal secretions
193. Inability to achieve successful erection of penis, so that sexual intercourse is not possible is
- (1) Primary infertility
  - (2) Secondary infertility
  - (3) Sterility
  - (4) Impotence
194. MTP is not permitted after ..... weeks of gestation
- (1) 12
  - (2) 20
  - (3) 14
  - (4) 16
195. Which of the following contraceptive method provides protection against STDs
- (1) Diaphragm
  - (2) Cervical caps
  - (3) Condoms
  - (4) All of these
196. Wasserman test is for
- (1) Syphilis
  - (2) AIDS
  - (3) Gonorrhoea
  - (4) Trichomoniasis
197. Hutchinson's teeth are observed in persons suffering from
- (1) AIDS
  - (2) Chlamydia
  - (3) Gonorrhoea
  - (4) Syphilis
198. If a couple already have one child & there is problem in second pregnancy, then it is a case of
- (1) Primary infertility
  - (2) Secondary infertility
  - (3) Physiological sterility
  - (4) None of these
199. A male suffering with oligospermia is advised to
- (1) Stop smoking & drinking alcohol
  - (2) Stop wearing tight undergarments
  - (3) Take bath in cold water & avoid excessive heat
  - (4) All of these
200. Physiological sterility is present
- (1) During lactation
  - (2) Before puberty
  - (3) During Adulthood
  - (4) After 30 years of age

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**TEST NO. : 9****ANSWERS**

1. (3)	41. (1)	81. (4)	121. (4)	161. (2)
2. (2)	42. (1)	82. (3)	122. (3)	162. (2)
3. (1)	43. (2)	83. (4)	123. (1)	163. (1)
4. (3)	44. (2)	84. (4)	124. (2)	164. (3)
5. (4)	45. (1)	85. (3)	125. (2)	165. (1)
6. (1)	46. (4)	86. (2)	126. (2)	166. (4)
7. (2)	47. (4)	87. (4)	127. (4)	167. (4)
8. (3)	48. (3)	88. (3)	128. (1)	168. (1)
9. (2)	49. (3)	89. (2)	129. (4)	169. (2)
10. (1)	50. (4)	90. (4)	130. (2)	170. (3)
11. (1)	51. (3)	91. (2)	131. (4)	171. (2)
12. (4)	52. (1)	92. (2)	132. (2)	172. (2)
13. (2)	53. (2)	93. (2)	133. (1)	173. (1)
14. (2)	54. (2)	94. (1)	134. (2)	174. (3)
15. (2)	55. (2)	95. (3)	135. (4)	175. (2)
16. (3)	56. (2)	96. (2)	136. (4)	176. (4)
17. (2)	57. (1)	97. (3)	137. (2)	177. (3)
18. (2)	58. (3)	98. (2)	138. (2)	178. (1)
19. (2)	59. (2)	99. (4)	139. (1)	179. (4)
20. (3)	60. (4)	100. (4)	140. (1)	180. (1)
21. (4)	61. (3)	101. (2)	141. (2)	181. (2)
22. (3)	62. (2)	102. (4)	142. (1)	182. (3)
23. (4)	63. (4)	103. (3)	143. (1)	183. (2)
24. (4)	64. (2)	104. (3)	144. (2)	184. (2)
25. (1)	65. (2)	105. (2)	145. (2)	185. (4)
26. (1)	66. (3)	106. (3)	146. (1)	186. (4)
27. (3)	67. (1)	107. (4)	147. (1)	187. (1)
28. (1)	68. (2)	108. (2)	148. (2)	188. (4)
29. (3)	69. (1)	109. (1)	149. (2)	189. (3)
30. (1)	70. (1)	110. (4)	150. (4)	190. (4)
31. (2)	71. (1)	111. (1)	151. (4)	191. (4)
32. (4)	72. (3)	112. (3)	152. (4)	192. (2)
33. (1)	73. (2)	113. (2)	153. (2)	193. (4)
34. (4)	74. (2)	114. (3)	154. (2)	194. (2)
35. (1)	75. (2)	115. (1)	155. (2)	195. (3)
36. (2)	76. (4)	116. (3)	156. (2)	196. (1)
37. (4)	77. (3)	117. (2)	157. (2)	197. (4)
38. (4)	78. (1)	118. (3)	158. (4)	198. (2)
39. (3)	79. (3)	119. (1)	159. (4)	199. (4)
40. (3)	80. (1)	120. (1)	160. (4)	200. (2)