PHYSICS

(SECTION-A)

1. The magnetic field $d\vec{B}$ due to a small current element $d\vec{l}$ at a distance $\vec{r}$ and element carrying current *i* is, or Vector form of Biot-savart's law is

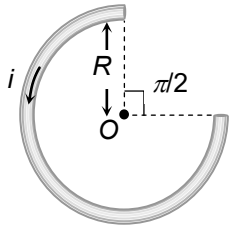
(A) $d\vec{B} = \frac{\mu_0}{4\pi} i \left(\frac{d\vec{l} \times \vec{r}}{r} \right)$

(B) $d\vec{B} = \frac{\mu_0}{4\pi} i^2 \left(\frac{d\vec{l} \times \vec{r}}{r} \right)$

(C) $d\vec{B} = \frac{\mu_0}{4\pi} i^2 \left(\frac{d\vec{l} \times \vec{r}}{r^2} \right)$

(D) $d\vec{B} = \frac{\mu_0}{4\pi} i \left(\frac{d\vec{l} \times \vec{r}}{r^3} \right)$

2. A current *i ampere* flows in a circular arc of wire whose radius is *R*, which subtend an angle $3\pi/2$ radian at its centre. The magnetic induction *B* at the centre is



(A) $\frac{\mu_0 i}{R}$ (B) $\frac{\mu_0 i}{2R}$

(C) $\frac{2\mu_0 i}{R}$ (D) $\frac{3\mu_0 i}{8R}$

3. A current of 0.1 *A* circulates around a coil of 100 turns and having a radius equal to 5 *cm*. The magnetic field set up at the centre of the coil is

$(\mu_0 = 4\pi \times 10^{-7}\ weber\ /\ ampere\ -metre)$

(A) $4\pi \times 10^{-5}\ tesla$ (B) $8\pi \times 10^{-5}\ tesla$

(C) $4 \times 10^{-5}\ tesla$ (D) $2 \times 10^{-5}\ tesla$

4. The magnetic field *B* with in the solenoid having *n* turns per metre length and carrying a current of *i ampere* is given by

(A) $\frac{\mu_0 ni}{e}$ (B) $\mu_0 ni$ (C) $4\pi\mu_0 ni$ (D) *ni*

5. Field inside a solenoid is

(A) Directly proportional to its length

(B) Directly proportional to current

(C) Inversely proportional to total number of turns

(D) Inversely proportional to current

6. Two straight horizontal parallel wires are carrying the same current in the same direction, *d* is the distance between the wires. You are provided with a small freely suspended magnetic needle. At which of the following positions will the orientation of the needle be independent of the magnitude of the current in the wires

(A) At a distance $d/2$ from any of the wires

(B) At a distance $d/2$ from any of the wires in the horizontal plane

(C) Anywhere on the circumference of a vertical circle of radius *d* and centre halfway between the wires

(D) At points halfway between the wires in the horizontal plane

7. A circular coil of radius *R* carries an electric current. The magnetic field due to the coil at a point on the axis of the coil located at a distance *r* from the centre of the coil, such that *r* >> *R*, varies as

(A) $\frac{1}{r}$ (B) $\frac{1}{r^{3/2}}$ (C) $\frac{1}{r^2}$ (D) $\frac{1}{r^3}$

8. A proton is projected with a velocity of 3 × 10^6 m/s perpendicular to a uniform magnetic field of 0.6T. Find the acceleration of the proton. mass of proton = $\frac{5}{3} \times 10^{-27}$ kg

(A) $\frac{864}{5} \times 10^{11}\ m/s^2$

(B) $\frac{864}{5} \times 10^{10}\ m/s^2$

(C) $\frac{864}{5} \times 10^{14}\ m/s^2$

(D) $\frac{864}{5} \times 10^{12}\ m/s^2$

9. A particle mass m, charge Q and kinetic energy T enters a transverse uniform magnetic field of induction $\vec{B}$. After 3 s the kinetic energy of the particle will be

(A) 3T (B) 2T (C) T (D) 4T

10. The direction of magnetic lines of forces close to a straight conductor carrying current will be
(A) Along the length of the conductor
(B) Radially outward
(C) Circular in a plane perpendicular to the conductor
(D) Helical

11. At a distance of 10 *cm* from a long straight wire carrying current, the magnetic field is 0.04 *T*. At the distance of 40 *cm*, the magnetic field will be
(A) 0.01 *T* (B) 0.02 *T*
(C) 0.08 *T* (D) 0.16 *T*

12. In a current carrying long solenoid, the field produced does not depend upon
(A) Number of turns per unit length
(B) Current flowing
(C) Radius of the solenoid
(D) All of the above three

13. Magnetic field due to 0.1 *A* current flowing through a circular coil of radius 0.1 *m* and 1000 turns at the centre of the coil is
(A) $2\times10^{-1}\,T$ (B) $4.31\times10^{-2}\,T$
(C) $6.28\times10^{-4}\,T$ (D) $9.81\times10^{-4}\,T$

14. A circular coil '*A*' has a radius *R* and the current flowing through it is *I*. Another circular coil '*B*' has a radius 2*R* and if 2*I* is the current flowing through it, then the magnetic fields at the centre of the circular coil are in the ratio of (*i.e.* B_A to B_B)
(A) 4 : 1 (B) 2 : 1
(C) 3 : 1 (D) 1 : 1

15. A dip needle in a plane perpendicular to magnetic meridian will remain
(A) Vertical
(B) Horizontal
(C) In any direction
(D) At an angle of dip to the horizontal

16. A toroid has number of turns per unit length *n*, current *i*, then the magnetic field is
(A) $\mu_0 ni$ (B) $\mu_0 n^2 i$
(C) $\mu_0 i/n$ (D) None of these

17. A straight wire carrying a current 10 *A* is bent into a semicircular arc of radius 5 *cm.* The magnitude of magnetic field at the center is
(A) $1.5\times10^{-5}\,T$ (B) $3.14\times10^{-5}\,T$
(C) $6.28\times10^{-5}\,T$ (D) $19.6\times10^{-5}\,T$

18. The magnetic field at the centre of a circular coil of radius *r* carrying current *I* is B_1. The field at the centre of another coil of radius 2 *r* carrying same current *I* is B_2. The ratio $\frac{B_1}{B_2}$ is
(A) $\frac{1}{2}$ (B) 1 (C) 2 (D) 4

19. An electron has mass $9\times10^{-31}\,kg$ and charge $1.6\times10^{-19}\,C$ is moving with a velocity of $10^6\,m/s$, enters a region where magnetic field exists. If it describes a circle of radius 0.10 *m*, the intensity of magnetic field must be
(A) $1.8\times10^{-4}\,T$ (B) $5.6\times10^{-5}\,T$
(C) $14.4\times10^{-5}\,T$ (D) $1.3\times10^{-6}\,T$

20. A charged particle moves with velocity *v* in a uniform magnetic field $\vec{B}$. The magnetic force experienced by the particle is
(A) Always zero
(B) Never zero
(C) Zero, if $\vec{B}$ and $\vec{v}$ are perpendicular
(D) Zero, if $\vec{B}$ and $\vec{v}$ are parallel

21. Lorentz force can be calculated by using the formula
(A) $\vec{F}=q(\vec{E}+\vec{v}\times\vec{B})$ (B) $\vec{F}=q(\vec{E}-\vec{v}\times\vec{B})$
(C) $\vec{F}=q(\vec{E}+\vec{v}\cdot\vec{B})$ (D) $\vec{F}=q(\vec{E}\times\vec{B}+\vec{v})$

22. A magnetic field
(A) Always exerts a force on a charged particle
(B) Never exerts a force on a charged particle
(C) Exerts a force, if the charged particle is moving across the magnetic field lines
(D) Exerts a force, if the charged particle is moving along the magnetic field lines

23. If an electron is going in the direction of magnetic field $\vec{B}$ with the velocity of $\vec{v}$ then the force on electron is
(A) Zero (B) $e(\vec{v}\cdot\vec{B})$
(C) $e(\vec{v}\times\vec{B})$ (D) None of these

24. An α particle and a proton travel with same velocity in a magnetic field perpendicular to the direction of their velocities, find the ratio of the radii of their circular path

(A) 4 : 1 (B) 1 : 4
(C) 2 : 1 (D) 1 : 2

25. Two free parallel wires carrying currents in opposite direction

(A) Attract each other
(B) Repel each other
(C) Neither attract nor repel
(D) Get rotated to be perpendicular to each other

26. Two straight parallel wires, both carrying 10 *ampere* in the same direction attract each other with a force of $1\times10^{-3}N$. If both currents are doubled, the force of attraction will be

(A) $1\times10^{-3}\ N$ (B) $2\times10^{-3}\ N$
(C) $4\times10^{-3}\ N$ (D) $0.25\times10^{-3}\ N$

27. The deflection in a moving coil galvanometer is

(A) Directly proportional to the torsional constant
(B) Directly proportional to the number of turns in the coil
(C) Inversely proportional to the area of the coil
(D) Inversely proportional to the current flowing

28. A small coil of *N* turns has an effective area *A* and carries a current *I*. It is suspended in a horizontal magnetic field $\vec{B}$ such that its plane is perpendicular to $\vec{B}$. The work done in rotating it by $180°$ about the vertical axis is

(A) *NAIB* (B) 2*NAIB*
(C) $2\pi NAIB$ (D) $4\pi NAIB$

29. If a current is passed in a spring, it

(A) Gets compressed
(B) Gets expanded
(C) Oscillates
(D) Remains unchanged

30. The vector form of Biot-Savart's law for a current carrying element is

(A) $d\vec{B}=\frac{\mu_0}{4\pi}\frac{Id\vec{l}\sin\phi}{r^2}$

(B) $d\vec{B}=\frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^2}$

(C) $d\vec{B}=\frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^3}$

(D) $d\vec{B}=\frac{\mu_0}{4\pi}\frac{Id\vec{l}\times\hat{r}}{r^2}$

31. Magnetic field due to 0.1A current flowing through a circular coil of radius 0.1 m and 1000 turns at the centre of the coil is :

(A) 0.2 T (B) 2×10^{-4} T
(C) 6.28×10^{-4} T (D) 9.8×10^{-4} T

32. A current I flows along the length of an infinitely long, straight, thin walled pipe. Then

(A) the magnetic field at all points inside the pipe is the same, but not zero
(B) the magnetic field at any point inside the pipe is zero
(C) the magnetic field is zero only on the axis of the pipe
(D) the magnetic field is different at different points inside the pipe.

33. The field due to a magnet at a distance *R* from the centre of the magnet is proportional to

(A) R^2 (B) R^3
(C) $1/R^2$ (D) $1/R^3$

34. Two short magnets with their axes horizontal and perpendicular to the magnetic meridian are placed with their centres 40 *cm* east and 50 *cm* west of magnetic needle. If the needle remains undeflected, the ratio of their magnetic moments $M_1:M_2$ is

(A) 4 : 5 (B) 16 : 25
(C) 64 : 125 (D) $2:\sqrt{5}$

35. If the magnetic flux is expressed in *weber*, then magnetic induction can be expressed in

(A) *Weber/m*^{2} (B) *Weber/m*
(C) *Weber-m* (D) *Weber-m*^{2}

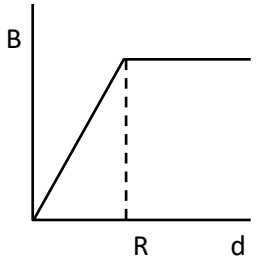
(SECTION-B)

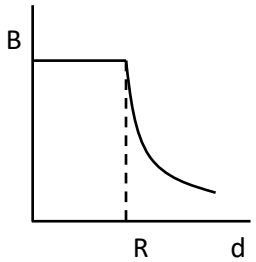
36. A magnetic needle is kept in a non-uniform magnetic field. It experiences
(A) A force and a torque
(B) A force but not a torque
(C) A torque but not a force
(D) Neither a torque nor a force

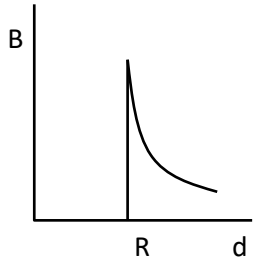
37. What happens to the force between magnetic poles when their pole strength and the distance between them are both doubled
(A) Force increases to two times the previous value
(B) No change
(C) Force decreases to half the previous value
(D) Force increases to four times the previous value

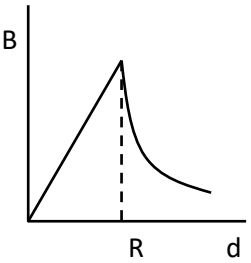
38. Ionized hydrogen atoms and α-particle with momenta enters perpendicular to a constant magnetic field, B. The ratio of their radii of their paths $r_H : r_\alpha$ will be :
(A) 1 ; 4 (B) 2 : 1
(C) 1 : 2 (D) 4 : 1

39. A cylindrical conductor of radius R is carrying constant current. The plot of the magnitude of the magnetic field, B with the distance, d from the centre of the conductor, is correctly represented by the figure :

(A)


(B)


(C)


(D)


40. *Weber*/m^2 is equal to
(A) *Volt* (B) *Henry*
(C) *Tesla* (D) All of these

41. The magnetic moment of a magnet of length 10 *cm* and pole strength 4.0 *Am* will be
(A) $0.4\ Am^2$ (B) $1.6\ Am^2$
(C) $20\ Am^2$ (D) $8.0\ Am^2$

42. Earth's magnetic field always has a horizontal component except at or Horizontal component of earth's magnetic field remains zero at
(A) Equator
(B) Magnetic poles
(C) A latitude of 60^o
(D) An altitude of 60^o

43. At magnetic poles of earth, angle of dip is
(A) Zero (B) 45^o
(C) 90^o (D) 180^o

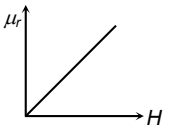
44. The correct relation is
(A) $\boldsymbol{B} = \frac{B_V}{B_H}$ (B) $\boldsymbol{B} = B_V \times B_H$
(C) $|\boldsymbol{B}| = \sqrt{B_H^2 + B_V^2}$ (D) $\boldsymbol{B} = B_H + B_V$
(Where B_H = Horizontal component of earth's magnetic field; B_V = Vertical component of earth's magnetic field and *B* = Total intensity of earth's magnetic field)

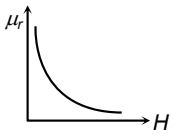
45. Consider a 10 cm long portion of a straight wire carrying a current of 10 A placed in a magnetic field of 0.1 T making an angle of 37º with the wire. What magnetic force does the wire experience?
(A) 6×10^{-1} N (B) 6×10^{-2} N
(C) 6×10^{-3} N (D) 6×10^{-4} N

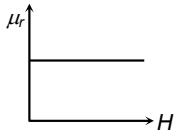
46. A point charge is moving in a circle with constant speed. Consider the magnetic field produced by the charge at a fixed point P (not centre of the circle) on the axis of the circle.
(A) it is constant in magnitude only
(B) it is constant in direction only
(C) it is constant in direction and magnitude both
(D) it is not constant in magnitude and direction both.

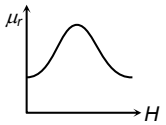
47. **Assertion :** A charged particle undergoes non-rectilinear motion in a constant magnetic field. The only force acting on the particle is the magnetic force. Then kinetic energy of this particle remains constant but momentum of the particle does not remains constant:
Reason : A force that always acts on the particle in direction perpendicular to its velocity does no work on the particle. But whenever a force acts on the particle, momentum of the particle does not remains constant:
(A) If both assertion and reason are true and reason is the correct explanation of assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of assertion.
(C) If Assertion is true but reason is false.
(D) If both assertion and reason are false.

48. For ferromagnetic material, the relative permeability (μ_r), versus magnetic intensity *(H)* has the following shape

(A) 

(B) 

(C) 

(D) 

49. **Assertion :** Basic difference between an electric line and magnetic line of force is that former is discontinuous and the latter is continuous or endless.
Reason : No electric lines of forces exist inside a charged body but magnetic lines do exist inside a magnet.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

50. **Assertion :** A compass needle when placed on the magnetic north pole of the earth rotates in vertical direction.
Reason : The earth has only horizontal component of its magnetic field at the north poles.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

(SECTION-A)

51. In the following reaction : $xA \longrightarrow yB$

$$\log\left[-\frac{d[A]}{dt}\right] = \log\left[-\frac{d[B]}{dt}\right] + 0.3$$

where –ve sign indicates rate of disappearance of the reactant. Thus, x : y is :

(A) 1 : 2 (B) 2 : 1

(C) 3 : 1 (D) 3 : 10

52. A first order reaction is 50% completed in 1.26×10^{14} s. How much time would it take for 100% completion?

(A) 1.26×10^{15} s (B) 2.52×10^{14} s

(C) 2.52×10^{28} s (D) infinite

53. For the reaction A + B → C; starting with different initial concentrations of A and B, initial rate of reaction were determined graphically in four experiments.

S.NO.	$[A]_0$/M (Initial conc.)	$[B]_0$/M (Initial conc.)	rate / (M s^{-1})
1	1.6×10^{-3}	5×10^{-2}	10^{-3}
2	3.2×10^{-3}	5×10^{-2}	4×10^{-3}
3	1.6×10^{-3}	10^{-1}	2×10^{-3}
4	3.2×10^{-3}	10^{-1}	8×10^{-3}

Rate law for the reaction from above data is

(A) $r = k[A]^2[B]^2$ (B) $r = k[A]^2[B]$

(C) $r = k[A][B]^2$ (D) $r = k[A][B]$

54. For a reaction

2A + B → C + D, the active mass of B is kept constant but that of A is tripled. The rate of reaction will -

(A) Decrease by 3 times

(B) Increase by 9 times

(C) Increase by 3 times

(D) Unpredictable

55. A reaction $A_2 + B_2 \rightarrow 2AB$ occurs by the following mechanism -

$A_2 \rightarrow A + A$ .....(slow)

$A + B_2 \rightarrow AB + B$ .....(fast)

$A + B \rightarrow AB$ .....(fast)

its order would be -

(A) 3/2 (B) 1 (C) 0 (D) 2

56. For which of the following, the units of rate constant and rate of the reaction are same?

(A) First order reaction

(B) Second order reaction

(C) Third order reaction

(D) Zero order reaction

57. The first order rate constant k is related to temperature. as log k = 15.0 – (10^6 /T). Which of the following pair of value is correct ?

(A) A = 10^{15} and E = 1.9×10^4 kJ

(B) A = 10^{-15} and E = 40 kJ

(C) A = 10^{15} and E = 40 kJ

(D) A = 10^{-15} and E = 1.9×10^4 kJ.

58. For a reaction, the rate constant is expressed as, $k = A.e^{-40000/T}$ The energy of the activation is -

(A) 40000 cal (B) 88000 cal

(C) 80000 cal (D) 8000 cal

59. 99% of a first order reaction was completed in 32 min. When will 99.9% of the reaction complete?

(A) 50 min (B) 46 min

(C) 49 min (D) 48 min

60. The rate constant for a second order reaction is 8.0×10^{-4} L $mol^{-1}min^{-1}$. How long will it take a 0.5M solution to be reduced to 0.25 M in reactant?

(A) 8.665×10^2 min (B) 8.0×10^{-4} min

(C) 2.50×10^3 min (D) 4.0×10^{-4} min

61. A radioactive isotope decomposes according to the first order with half life period of 15 hr. 80% of the sample will decompose in -

(A) 15 × 0.8 hr

(B) 15 × (log 8) hr

(C) 15 × (log5 / log2) hr. (or 34.83) hr

(D) 15 × 10/ 8 hr

62. For a reaction for which the activation energies of forward and reverse reactions are equal -

(A) $\Delta H = 0$

(B) $\Delta S = 0$

(C) The order is zero

(D) There is no catalyst

63. Which of the following explains the increase of the reaction rate by catalyst?
(A) Catalyst decreases the rate of backward reaction so that the rate of forward reaction increases
(B) Catalyst provides extra energy to reacting molecules so that they may reduce effective collisions
(C) Catalyst provides an alternative path of lower activation energy to the reactants
(D) Catalyst increases the number of collisions between the reacting molecules.

64. One mole of electron passes through each of the solution of $AgNO_3$, $CuSO_4$ and $AlCl_3$ when Ag, Cu and Al are deposited at cathode. The molar ratio of Ag, Cu and Al deposited are
(A) 1 : 1 : 1 (B) 6 : 3 : 2
(C) 6 : 3 : 1 (D) 1 : 3 : 6

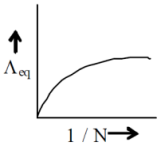
65. During electrolysis of an aqueous solution of sodium sulphate if 2.4 L of oxygen at STP was liberated at anode. The volume of hydrogen at STP, liberated at cathode would be :
(A) 1.2 L (B) 2.4 L
(C) 2.6 L (D) 4.8 L

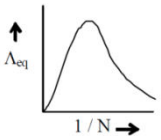
66. When an aqueous solution of lithium chloride is electrolysed using graphite electrodes
(A) Cl_2 is liberated at the anode.
(B) Li is deposited at the cathode
(C) as the current flows, pH of the solution around the cathode remains constant
(D) as the current flows, pH of the solution around the cathode decreases.

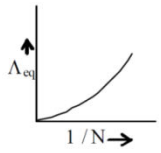
67. A standard hydrogen electrons has zero electrode potential because
(A) hydrogen is easier to oxidise
(B) this electrode potential is assumed to be zero
(C) hydrogen atom has only one electron
(D) hydrogen is the lightest element.

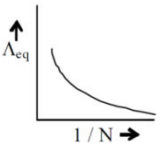
68. 1 mole of Al is deposited by X coulomb of electricity passing through aluminium nitrate solution. The number of moles of silver deposited by X coulomb of electricity from silver nitrate solution is -
(A) 3 (B) 4 (C) 2 (D) 1

69. The specific conductance of a solution is 0.3568 ohm^{-1} cm^{-1}. When placed in a cell the conductance is 0.0268 ohm^{-1}. The cell constant is-
(A) 1.331 cm^{-1} (B) 13.31 cm^{-1}
(C) 0.665 cm^{-1} (D) 6.65 cm^{-1}

70. The variation of equivalent conductance vs decrease in concentration of a strong electrolyte is correctly given in the plot -
(A) 

(B) 

(C) 

(D) 

71. For an electrolytic solution of 0.05 mol L^{-1}, the conductivity has been found to be 0.0110 Scm^1. The molar conductivity is-
(A) 0.055 S cm^2 mol^{-1}
(B) 550 S cm2 mol^{-1}
(C) 0.22 S cm^2 mol^{-1}
(D) 220 S cm2 mol^{-1}

72. A certain current liberates 0.504 g of H_2 in 2 hours. How many grams of copper can be liberated by the same current flowing for the same time in $CuSO_4$ solution -
(A) 31.8 g (B) 16.0 g
(C) 12.7 g (D) 63.5 g

73. The quantity of electricity required to liberate 0.01g equivalent of an element at the electrode is -
(A) 9650C (B) 96500C
(C) 965C (D) 96.5C

74. A solution containing one mol per litre each of $Cu(NO_3)_2$ $AgNO_3$, $Hg_2(NO_3)_2$ and $MgSO_4$ is being electrolysed by using inert electrodes. The values of standard electrode potentials in volt (reduction potentials) are,
$Ag^+|Ag = 0.80$, $Hg_2^{+2}|Hg = 0.79$
Cu^{+2} | Cu = + 0.34 and Mg^{+2} | Mg = –2.37
With increasing voltage, the sequence of deposition of metals on the cathode will be -
(A) Ag, Hg, Cu, Mg
(B) Mg, Cu, Hg, Ag
(C) Ag, Hg, Cu
(D) Cu, Hg, Ag

75. The reaction 1/2 H_2 (g) + AgCl (s) = H^+ (aq) + Cl– (aq) + Ag (s) can be represented in the galvanic cell as-
(A) Ag |AgCl (s)| KCl (sol) | |$AgNO_3$ (sol)|Ag
(B) PtH_2 (g) | HCl (sol) | | $AgNO_3$ (sol)
(C) Pt|H_2 (g) | HCl (sol) | | AgCl (s) | Ag
(D) Pt|H_2 (g) | KCl (sol) | | AgCl (s)| Ag

76. The standard electrode potential of Zn, Ag and Cu are –0.76, 0.80 and 0.34 volt respectively; then -
(A) Ag can oxidise Zn and Cu
(B) Ag can reduce Zn^{2+} and Cu^{2+}
(C) Zn can reduce Ag^+ and Cu^{2+}
(D) Cu can oxidise Zn and Ag

77. The standard oxidation potentials, E° for the half reactions are as Zn = Zn^{2+} + 2e, E° = 0.76 V, Fe = Fe^{2+} + 2e, E° = 0.41 V. The emf for the cell reaction Fe^{2+} + Zn → Zn^{2+} + Fe, is -
(A) – 0.35 V (B) + 0.35 V
(C) + 1.17 V (D) – 1.17 V

78. For the reactions
MnO_4^- + $8H^+$ + $5e^-$ → Mn^{2+} + $4H_2O$,
E° = 1.51 V
MnO^2 + $4H^+$ + $2e^-$ → Mn^{2+} + $2H_2O$,
E° = 1.23V then for the reaction
MnO_4^- + $4H^+$+ $3e^-$ → MnO_2 + $2H_2O$, E° is -
(A) 1.70 V (B) 5.09 V
(C) 0.28 V (D) 0.84 V

79. The cell reaction Zn + Cu2+ → Zn^{2+} + Cu, is best represented by -
(A) Cu / Cu^{2+} || Zn^{2+} / Zn
(B) Zn / Zn^{2+} || Cu^{2+} / Cu
(C) Cu^{2+} / Cu || Zn / Zn^{2+}
(D) Pt / Zn^{2+} || Pt / Cu^{2+}

80. In electrochemical corrosion of metals, the metal undergoing corrosion -
(A) Acts as anode
(B) Acts as cathode
(C) Undergoes reduction
(D) None

81. When a lead storage battery is charged it acts as-
(A) A fuel cell
(B) An electrolytic cell
(C) A galvanic cell
(D) A concentration cell

82. The following data pertain to reaction between A and B :

S.No.	[A] $mol.L^{-1}$	[B] $mol.L^{-1}$	Rate $mol.L^{-1}s^{-1}$
I	1×10^{-2}	2×10^{-2}	2×10^{-4}
II	2×10^{-2}	2×10^{-2}	4×10^{-4}
III	2×10^{-2}	4×10^{-2}	8×10^{-4}

Which of the following inference(s) can be drawn from the above data?
(a) Rate constant of the reaction is 10^{-4}
(b) Rate law of the reaction is k[A][B]
(c) Rate of reaction increases four times on doubling the concentration of both the reactant.
Select the correct answer codes :–
(A) a, b and c (B) a and b
(C) b and c (D) c alone

83. For a chemical reaction, 2A + 2B ⟶C + D, the order of reaction is one with respect to A and one with respect to B. The initial rate of the reaction is 4×10^{-2} mol L^{-1} s^{-1}. When 50% of the reactants are converted into products, the rate of the reaction would become-
(A) 2×10^{-2} mol $L^{-1}s^{-1}$
(B) 1×10^{-2} mol $L^{-1}s^{-1}$
(C) 4×10^{-2} mol L^{-1} s^{-1}
(D) 2×10^{-1} mol L^{-1} s^{-1}

84. Expression showing change of rate constant with temperature is –
(A) Temperature coefficient = $\frac{k_{T+10}}{k_T}$
(B) $k = Ae^{\frac{E}{RT}}$
(C) $C_t = C_0e^{-kt}$
(D) None of these

85. The $t_{0.5}$ for the first order reaction, $PCl_5(g) \longrightarrow PCl_3(g) + Cl_2(g)$ is 20 min. The time in which the concentration. of PCl_5 reduces to 25% of the initial concentration. is close to-
(A) 22 min (B) 40 min
(C) 90 min (D) 50 min

(SECTION-B)

86. If a is the initial concentration of the reactant, then the half life period of a reaction of n^{th} order is directly proportional to -
(A) a^n (B) a^{n-1}
(C) a^{1-n} (D) a^{n+1}

87. The charge required for the oxidation of one mole Mn_3O_4 into MnO_4^{2-} in presence of alkaline medium is
(A) 5 × 96500 C (B) 96500 C
(C) 10 × 96500 C (D) 2 × 96500 C

88. The passage of current through a solution of certain electrolyte results in the evolution of H_2 at cathode and Cl_2 at anode. The electrolytic solution is -
(A) Water (B) H_2SO_4
(C) Aq. NaCl (D) Aq. $CuCl_2$

89. The resistance of a solution 'A' is 40 ohm and that of solution 'B' is 70 ohm, both solutions being taken in the same conductivity cell. If equal volumes of solutions 'A' and 'B' are mixed, what will be the resistance of the mixture using the same cell ? (Assume that there is no increase in the degree of dissociation of 'A' and 'B' on mixing.)
(A) 50.9 ohm (B) 101.8 ohm
(C) 110 ohm (D) 50 ohm

90. At 298 K, the standard reduction potentials for the following half reactions are given as
Zn^{2+} (aq) + 2e– $\rightarrow$ Zn (s); – 0.762
Cr^{3+} (aq) + 3e– $\rightarrow$ Cr (s); – 0.740
$2H^+$ (aq) + 2e– $\rightarrow$ H_2 (g); 0.00
Fe^{3+} (aq) + e– $\rightarrow$ Fe^{2+} (aq); + 0.770
The strongest reducing agent is -
(A) Zn(s) (B) H_2(g)
(C) Cr(s) (D) Fe^{2+}(aq)

91. Standard electrode potentials of Fe^{2+} + 2e $\rightarrow$ Fe and Fe^{3+} + 3e $\rightarrow$ Fe are – 0.440 V and – 0.036V respectively. The standard electrode potential (E^0) for Fe^{3+} + e $\rightarrow$ Fe^{2+} is -
(A) – 0.476 V (B) – 0.404 V
(C) + 0.404 V (D) + 0.772V

92. The value of the reaction quotient, Q, for the cell Zn(s)|Zn^{2+}(0.01 M)||Ag^+(1.25 M)|Ag(s) is -
(A) 156 (B) 125
(C) 1.25×10^{-2} (D) 6.40×10^{-3}

93. **Assertion :** Sodium ions are discharged in preference to hydrogen ions at a mercury cathode.
Reason : The nature of the cathode can effect the order of discharge of ions.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

94. **Assertion :** Electrical conductivity of copper increases with increase in temperature.
Reason : The electrical conductivity of metals is due to the motion of electrons.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

95. **Assertion :** A small amount of acid or alkali is added before electrolysis of water.
Reason : Pure water is weak electrolyte.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

96. **Assertion :** Instantaneous rate of reaction is equal to dx/dt .
Reason : It is the rate of reaction at any particular instant of time.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

97. **Assertion :** Molecularity has no meaning for a complex reaction.
Reason : The overall molecularity of a complex reaction is equal to the molecularity of the slowest step.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

98. **Assertion :** If in a zero order reaction, the concentration of the reactant is doubled, the half-life period is also doubled.
Reason : For a zero order reaction, the rate of reaction is independent of initial concentration.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

99. **Assertion :** If the activation energy of a reaction is zero, temperature will have no effect on the rate constant.
Reason : Lower the activation energy, faster is the reaction.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

100. **Assertion :** Galvanised iron does not rust.
Reason : Zinc has a more negative electrode potential than iron.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If assertion is false but reason is true.

BIOLOGY

BOTANY (SECTION-A)

101. Mendel proposed which of the following terms for hereditary units?
(A) Factor (determiner) (B) Genome
(C) Genetic particle (D) None of these

102. When a true breeding pea plant that has yellow seeds is pollinated by a plant that has green seeds, then all the F1 plants have yellow seeds. This means that the allele for yellow is
(A) Heterozygous (B) Dominant
(C) Recessive (D) Lethal

103. An organism with two identical alleles for a given trait is
(A) Homozygous
(B) Segregating
(C) Dominant
(D) A hermaphrodite

104. In Mendelism, the linkage was not observed due to
(A) Mutation
(B) Independent assortment
(C) Synapsis
(D) Crossing over

105. A cross between plants having RRYY and rryy composition will yield plants with
(A) Round and yellow seeds
(B) Round and green seeds
(C) Wrinkled and yellow seeds
(D) Wrinkled and green seeds

106. Blood group 'B' will have alleles
(A) ii (B) I^AI^A (C) I^BI^B (D) I^AI^B

107. A person with antigens 'B' in RBC and antibodies 'A' in the plasma belongs to the blood group
(A) A (B) B (C) AB (D) O

108. Drosophila has four pairs of chromosomes. How many linkage groups does it have?
(A) Eight
(B) Four
(C) One less than the pairs of chromosomes
(D) One more than the pairs of chromosomes

109. Down's syndrome occurs due to the gain in extra copy of
(A) Chromosome 19
(B) Chromosome 5
(C) Chromosome 21
(D) Chromosome 24

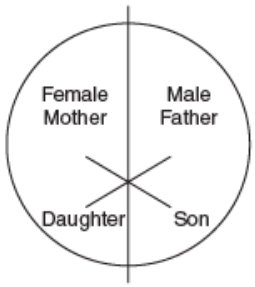
110. In human beings, the colour of skin is controlled by
(A) Multiple alleles (B) Lethal genes
(C) Polygenic effect (D) None of these

111. Which enzyme is defective in PKU?
(A) DOPA $\xrightarrow{\text{Enzyme(1)}}$ Melanin
(B) Tyrosine $\xrightarrow{\text{Enzyme(2)}}$ Thyroxin
(C) Phenylalanine $\xrightarrow{\text{Enzyme(3)}}$ Tyrosine
(D) Tyrosine $\xrightarrow{\text{Enzyme(4)}}$ Homogentisic acid
(A) Enzyme (A) (B) Enzyme (B)
(C) Enzyme (C) (D) Enzyme (D)

112. **Assertion:** In humans, the gamete contributed by the male determines whether the child Produced will be male or female.

Reason: Sex in human is a polygenic trait depending upon a cumulative effect of some gene on X-chromosomes and some on Y-chromosomes.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

113. Represented below is the inheritance pattern of the certain type of traits in humans. Which one of the following conditions could be an example of this pattern?



(A) Sickel cell anaemia
(B) Haemophilia
(C) Thalassemia
(D) Phenylketonuria

114. A man whose father was colour blind marries a woman who had a colour blind mother and normal father. What percentage of male children of this couple will be colour blind?
(A) 25% (B) 0%
(C) 50% (D) 75%

115. A human female with Turner's syndrome
(A) Has 45 chromosomes with XO
(B) Has one additional X chromosome
(C) Exhibits male characters
(D) Is able to produce children with normal husband

116. Match the terms in Column I with their description in Column II and choose the correct

	Column I		Column II
(a)	Dominance	(i)	Mnay genes govern a single character
(b)	Codominance	(ii)	In a heterozygous organism only one allele expresses itself
(c)	Pleiotropy	(iii)	In a heterozygous organisms both alleles express themselves fully
(d)	Polygenic Inheritance	(iv)	A single gene influences many characters

Options:

	(a)	(b)	(c)	(d)
(A)	ii	i	iv	iii
(B)	ii	iii	iv	i
(C)	iv	i	ii	iii
(D)	iv	iii	i	ii

117. If a colour-blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour-blind is
(A) 0.5 (B) 0.75 (C) 1 (D) 0

118. Which of the following has been used for genetic researches?
(A) Pisum (B) Neurospora
(C) E.coli (D) All of these

119. The main reason for the success of Mendel was
(A) Study of all the characters at the same time
(B) Study of one character at one time
(C) Study of all the plants at the same time
(D) Counting of plants

120. Select the false statement from the following:
(A) Mendel for the fi rst time applied statistical analysis and mathematical logics to problems in biology.
(B) Mendel's experiment had a large sampling size, which gave greater credibility to the data that he collected.
(C) Mendel conducted artifi cial cross-pollination experiment using true-breeding pea lines.
(D) Mendel selected 14 true-breeding pea plant varieties, as pairs which were similar except for two characters with contrasting traits.

121. The substitution of amino acid in the globin protein results due to the single bass substitution at the sixth codon of the beta globin gene from.
(A) GAG to GGG (B) CAG to GAG
(C) GAG to GUG (D) GGC to GGA

122. F_2 generation in a Mendelian cross showed that both genotypic and phenotypic rations are same as 1 : 2 : 1. It represents a case of
(A) Co-dominance
(B) Dihybrid cross
(C) Monohybrid cross with complete dominance
(D) Monohybrid cross with incomplete dominance

123. If two persons with 'AB' blood group marry and have sufficiently large number of children, these children could be classified as 'A' blood group : 'AB' blood group : 'B' blood group in 1 : 2 : 1 ratio. Modern technique of protein electrophoresis reveals the presence of both 'A' and 'B' type proteins in 'AB' blood group individuals. This is an example of
(A) Codominance
(B) Incomplete dominance
(C) Partial dominance
(D) Complete dominance

124. In his classic experiments on pea plants, Mendel did not use.

(A) Pod length (B) Seed shape

(C) Flower position (D) Seed colour

125. The mechanism that causes a gene o move from the linkage group to another is called.

(A) Duplication (B) Translocation

(C) Crossing over (D) Inversion

126. An inherited character and its detectable variant is called

(A) Factor (B) Gene

(C) Trait (D) Allele

127. If a cross made between two individuals produces offspring with 50% dominant character (A) and 50% recessive character (a), then the genotypes of the parents are

(A) Aa × Aa (B) Aa × aa

(C) AA × aa (D) Aa × AA

128. A phenomenon in which neither of the alleles of a gene is completely dominant over the other and the F_1 individual is intermediate between the two parents is called

(A) Incomplete dominance

(B) Complete dominance

(C) Codominance

(D) Epistasis

129. Find the odd one w.r.t. condition where heterozygous individual shows intermediate phenotype.

(A) Starch grain size in pea seeds.

(B) Flower colour in *Mirabilis.*

(C) Flower colour in *Antirrhinum.*

(D) Stem height in pea plant.

130. Select the incorrectly matched pair:

(A) Dominance–In a heterozygous organism, only one allele expresses itself.

(B) Codominance–In a heterozygous organism, both alleles express themselves fully.

(C) In complete dominance–In a heterozygous organism, both alleles express themselves partially.

(D) Multiple alleles–All alleles present on different locus on same chromosome.

131. Law of independent assortment

(A) Is a universal phenomenon

(B) Results in new linkage group

(C) Can be observed for genes present on same chromosome

(D) Occurs only when genes are present on non- homologous chromosomes.

132. A gene which changes the effect of another non-allelic gene that is not located on same locus of the homologous chromosomes.

(A) Epistatic gene

(B) Duplicate gene

(C) Supplementary gene

(D) Complementary gene

133. The number of linkage groups in a sperm and ovum of human is, respectively

(A) 24, 23 (B) 23, 22

(C) 23, 23 (D) 23, 24

134. Which of the following show continuous variation is a population?

(A) Human skin colour

(B) Cob length in maize

(C) Kernel colour in wheat

(D) All of these

135. A mulatto man (Aa Bb) is married to a white woman. Find the possible phenotypic ratio in their progeny.

(A) 1 : 1 : 1 : 1 (B) 1 : 2 : 1

(C) 7 : 1 : 1: 7 (D) 9 : 3 : 3 : 1

(SECTION-B)

136. The probability of either a male or a female child in each pregnancy is always

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

137. Mark the correct statements:

I. There are many chemical and physical factors that induce mutations.

II. Pedigree study provides a strong tool, which is utilized to trace the inheritance of specific trait, abnormality or disease..

III. The pattern of inheritance of chromosomal disorders can be traced in a family by the pedigree analysis.

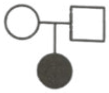
(A) All are correct

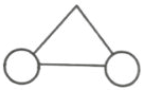
(B) (A) and (II) are correct

(C) (II) and (III) are correct

(D) I and (III) are correct

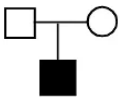
138. Which of the following consanguineous mating? symbols represents

(A)  (B) 

(C)  (D) 

139. All given traits are sex limited, except
(A) Milk gland in females
(B) Beard in man
(C) Pattern baldness
(D) Antlers in male deer

140. Which of the following is correct for the pedigree given.



(A) Disease present in child may be autosomal dominant.
(B) Considered trait is autosomal recessive.
(C) Considered trait is Y-linked.
(D) Considered trait can be X-linked dominant.

141. A normal women whose father was haemophilic marries a normal man. What percentage of the progeny is affected?
(A) 25% of son's is affected
(B) 75% of progeny is affected.
(C) 50% of son's is affected
(D) All offspring are phenotypically normal

142. Read the following statements and state true (T) and false (F):

A. Deletions and insertions of base pairs of DNA causes frame shift mutations.
B. Classical example of point mutation is sickle cell anaemia.
C. Mendelian disorders are mainly determined by alteration or mutation in the single gene.
D. Haemophilia, colour blindness and cystic fibrosis are sex-linked recessive disorders.

	A	B	C	D
(A)	T	T	F	T
(B)	T	T	T	F
(C)	F	F	T	F
(D)	F	T	F	T

143. Match column I with column II and select the correct option.

Column I
A. Sickle cell anaemia
B Down's syndrome
C Klinefelter syndrome
D Turner's syndrome

Column II
(i) Mental retardation
(ii) Absence of sex chromosome
(iii) Point mutation
(iv) Trisomy of allosome

(A) A(iv), B(ii), C(iii), D(i)
(B) A(iii), B(i), C(iv), D(ii)
(C) A(iii), B(iv), C(i), D(ii)
(D) A(iii), B(iv), C(ii), D(i)

144. Sickle cell anaemia is caused due to
(A) Non-sense mutation
(B) Inversion
(C) Mis-sense mutation
(D) Frame-shift mutation

145. Which condition is caused by mutations that involve entire chromosome rather than a gene?
(A) Sickle cell anaemia
(B) PKU
(C) Klinefelter syndrome
(D) Haemophilia

146. How many trisomies are possible in humans?
(A) 22 (B) 46
(C) 23 (D) 44

147. **Assertion:** Increase in a whole set of chromosome in an organism is known as polyploidy.
Reason: Failure of cytokinesis after telophase stage of cell division results in polyploidy.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

148. **Assertion :** Down's syndrome is chromosomal disorder
Reason : It occurs due to trisomy of 21 chromosome.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

149. **Assertion:** UV radiation is mutagen.
Reason: UV radiation can cause mutation in organism.
(A) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(B) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(C) If the assertion is true but the reason is false.
(D) If both the assertion and reason are false.

150. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other, dividing cells. This would result in:
(A) Aneuploidy
(B) Polyploidy
(C) Somaclonal variation
(D) Polyteny

ZOOLOGY (SECTION-A)

151. Which of the following has nonoxynol-9 as a spermicide?
(A) Multiload-375 (B) Norplant
(C) Condom (D) Sponge

152. Read the following statements:
(i) RU-486 is an anti-progestin drug used to induce abortions.
(ii) Oral contraceptives are helpful in stimulating menses who has amenorrhoea.
(iii) Intrauterine devices can be made of copper, plastic or steel.
(iv) Mala-N is once-a-week pill.
Which of the above statement(s) is/are the incorrect?
(A) (i) and (ii) (B) (ii) and (iv)
(C) Only (iii) (D) Only (iv)

153. Which of the following is an incorrect statement regarding Norplant?
(A) It is effective for nearly 5 years.
(B) It is active product is progestin.
(C) It causes irregular menstrual bleeding.
(D) It has very high failure rate.

154. If a woman is expected to show ovulation on 24th April, which dates would be suggested as 'safe' period w.r.t. rhythm method of contraception?
(A) 21-23 April (B) 24-27 April
(C) 21-28 April (D) 28-30 April

155. Periodic abstinence is one of the natural contraceptive method in which a couple avoids coitus from
(A) Day 1-5 of menstrual cycle
(B) Day 10-17 of menstrual cycle
(C) Day 5-10 of menstrual cycle
(D) Day 20-24 of menstrual cycle

156. Which of the following method of contraception kas maximum failure rate?
(A) Oral pills
(B) Condom
(C) Copper-T
(D) Coitus interruptus

157. Condoms are one of the most popular contraceptives because of
(A) Their self-usability
(B) Their easy availability
(C) Non-interference with sexual desire
(D) All of these

158. Oral contraceptives are aimed at lowering the levels of which of the following?
(A) Progesterone
(B) LH
(C) FSH
(D) Both (B) and (C)

159. All of the following are side effects of using IUDs, except
(A) Heavy menstrual bleeding
(B) Uterine infection
(C) Suppress sperm motility
(D) Increase risk of uterine perforation

160. Lactational amenorrhoea means
(A) Oral administration of oestrogen
(B) Coitus interruption
(C) Medical termination of pregnancy
(D) Absence of menstruation during intense lactation

161. Select the incorrect statement regarding contraceptive method.
(A) Emergency contraceptive pills are effective up to 72 hours of coitus.
(B) Mode of action of skin implant is similar to that of pills and their effective period is much longer.
(C) Diaphragm is an example of a female condom and protects against STIs.
(D) Spermicidal, creams and foams increase the contraceptive efficiency of condom.

162. World Population Day is observed on
(A) 11th July
(B) 1st December
(C) 21st June
(D) 11th November

163. Read the following statements and choose the correct options:
(i) Amniocentesis is often misused for sex determination.
(ii) Ultrasound imaging is non-invasive method used for monitoring foetal growth.
(iii) The results of CVS are obtained sooner than amniocentesis.
(iv) CVS can be performed between 10 and 12 weeks of pregnancy, while amniocentesis can be done only after 14-16 weeks of pregnancy.
(v) Both amniocentesis and CVS help in detecting chromosomal abnormalities in foetus.
(A) (i) and (ii) (B) (ii) and (iii)
(C) (iii) and (v) (D) All are correct

164. All of the following STIs are curable if defected early and treated property, except
(A) Chlamydia (B) Chancroid
(C) Gonorrhoea (D) Genital herpes

165. The term venereal disease refers to diseases transmitted by the agency of
(A) Blood
(B) Air
(C) Sexual contact
(D) Pencils, doorknobs and handkerchief

166. Select the wrong statement:
(A) Peritonitis is a life-threatening complication of Gonorrhoea.
(B) Patients with AIDS have opportunistic diseases like Mycobacterium infections, toxoplasmosis and Kaposi sarcoma.
(C) In patients with STIS, both the sexual partner should be treated simultaneously.
(D) STIs like hepatitis-B and genital herpes can be cured completely if they are detected early and treated properly.

167. Which of the following are all sexually transmitted infections?
(A) Malaria, HIV, Trichomoniasis
(B) Gonorrhoea, AIDS, Syphilis syndrome
(C) Cholera, Chlamydia, Down
(D) Haemophilia, Typhoid, Syphilis.

168. Which of the following is incorrect regarding STIs?
(A) Females infected with STIs may often be asymptom- atic and hence remain undetected for long.
(B) STIs may lead to complications like pelvic inflam- matory diseases and ectopic pregnancy.
(C) Patients with STIs should report to quacks for early detection of disease.
(D) STIs are reported to be very high among persons in the age group of 15-24 years.

169. Read the following statements
(i) HIV and hepatitis-B are transmitted by sharing of injection needles, surgical instruments and from an infected mother to foetus.
(ii) Early symptoms of STIs are itching, fluid discharge, slight pain, swelling, etc., in the genital region.
(iii) Amniocentesis is often misused for sex determination.
(iv) STIs are also called venereal disease.
Which of the following is/are incorrect?
(A) (i) and (ii) (B) (ii) and (iii)
(C) (iv) only (D) None of these

170. In test tube baby program, the embryo with more than 8 blastomeres is transferred into uterus and is called
(A) Intrauterine Transfer (IUT)
(B) Zygote Intrafallopian Transfer (ZIFT)
(C) Intrauterine Transfer (TUT)
(D) Artificial Insemination (AD)

171. The technique in which sperm is directly injected into egg cytoplasm is called
(A) Artificial insemination
(B) Intrauterine Insemination
(C) Intracytoplasmic Sperm Injection
(D) In vivo fertilization

172. _____ is a technique in which the semen collected from either the husband or a healthy donor is artificially introduced either into the vagina or into the uterus.
(A) ICSI
(B) GIFT
(C) Artificial insemination
(D) IVF

173. A technique called GIFT is recommended for those females
(A) Who ovulate regularly
(B) Who cannot produce an ovum
(C) Who cannot provide a suitable environment for embryo development
(D) Whose cervix is too narrow to allow passage of sperms

174. Which of the following statements are true for spermatogenesis but do not hold true for Oogenesis?
(A) It results in the formation of haploid gametes
(B) Differentiation of gamete occurs after the completion of meiosis
(C) Meiosis occurs continuously in a mitotically dividing stem cell population
(D) It is controlled by the Luteinising hormone (LH) and Follicle Stimulating Hormone (FSH) secreted by the anterior pituitary
(e) It is initiated at puberty
Choose the most appropriate answer from the options given below:
(A) (B) and (C) only
(B) (B), (D) and (e) only
(C) (B), (C) and (e) only
(D) (C) and (e) only

175. Match List- with List- with respect to methods of Contraception and their respective actions.

List-I		**List-II**	
(A)	Diaphragms	(i)	Inhibit ovulation and Implantation
(B)	Contraceptive Pills	(ii)	Increase phagocytosis of sperm within Uterus
(C)	Intra Uterine Devices	(iii)	Absence of Menstrual cycle and ovulation following parturition
(D)	Lactational Amenorrhea	(iv)	They cover the cervix blocking the entry of spermsproduct

Choose the correct answer from the options given below:
(A) (A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)
(B) (A) - (ii), (B) - (iv), (C) - (i), (D) - (iii)
(C) (A) - (iii), (B) - (ii), (C) - (i), (D) - (iv)
(D) (A) - (iv), (B) - (i), (C) - (iii), (D) - (ii)

176. **Assertion :** Osteoporosis is characterised by decreased bone mass and increased chances of fractures.
Reason : Common cause of osteoporosis is increased levels of estrogen. In the light of the above statements, choose the most appropriate answer from the options given below:
(A) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(B) Assertion is correct but Reason is not correct
(C) Assertion is not correct but Reason is correct
(D) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.

177. Athlete's foot is caused by
(A) Tinea barbae
(B) Tinea pedis
(C) Tinea capitis
(D) Candida albicans

178. Which of the following set of diseases is caused by bacteria?
(A) Typhoid and smallpox
(B) Typhoid and mumps
(C) Cholera and tetanus
(D) Herpes and smallpox

179. Read the following statements and choose the correct ones:
(i) Rubella is also called German measles.
(ii) Syphilis is an STD caused by protozoan.
(iii) Inability of heart to pump sufficient blood is called heart failure.
(iv) Rheumatoid arthritis is caused due to wear and tear of articular cartilage.
(A) (i) and (ii) (B) (ii) and (iii)
(C) (i) and (iii) (D) (iii) and (iv)

180. Leishmania tropica causes
(A) Kala azar
(B) Oriental sore
(C) Cutaneous leishmaniasis
(D) Both (B) and (C)

181. Formation of greyish membrane on pharynx, sore throat, fever, is seen in
(A) Plague (B) Diphtheria
(C) Tuberculosis (D) Tetanus

182. Swelling of body parts like limbs occurs in elephantiasis due to
(A) Deficiency of proteins causing oedema
(B) Renal failure
(C) Heart failure
(D) Blockage of lymphatic circulation by filarial worm

183. Which of the following is an incorrect statement?
(A) Typhoid is also called Enteric fever.
(B) Dengue fever, chikungunya and yellow fever are spread by Aedes mosquito.
(C) Ascariasis is caused by the bite of female Culex mosquito.
(D) Polio is called infantile paralysis.

184. Cerebral malaria is caused by
(A) Plasmodium vivax
(B) Plasmodium malariae
(C) Plasmodium falciparum
(D) Plasmodium ovale

185. Which of the following is an incorrect statement?
(A) Oral rehydration therapy is used for treatment of cholera.
(B) Endemic disease exists permanently in a particular region or population.
(C) Black foot disease is caused due to excess of lead in diet.
(D) Minamata disease is a disease of CNS caused by mercury poisoning.

(SECTION-B)

186. Which of the following is not an example of artificially acquired passive immunity?
(A) Antivenom given to person who had snakebite.
(B) IgG received by foetus across placenta.
(C) Anti-tetanus serum given to an injured patient.
(D) Anti-rabies serum given to a patient after dog bite.

187. The antibody produced in an allergic or anaphylactic response is
(A) IgA (B) IgE
(C) IgM (D) IgG

188. Which of the following cells can non-specifically kill virus-infected cells and some tumor cells of the body by creating perforin lined pores in the plasma membrane of the target cells?
(A) B-lymphocyte (B) Plasma cell
(C) Natural killer cell (D) Helper T-cell

189. Read the following statements and choose the correct option:
Statement I: During vaccination, killed or attenuated antigen is introduced to stimulate cell-mediated and antibody-mediated immune responses, leading to the production of memory cells.
Statements II: Vaccination is an example of artificial acquired active immunity.
(A) Both statements are correct
(B) Both statements are incorrect
(C) Only statements I is correct
(D) Only statements II is correct

190. Cytotoxic T-lymphocytes participate in cell-mediated 4 immune reactions by
(A) Killing of virus-infected cells
(B) Killing of tumor cells
(C) Rejecting foreign organs
(D) All of these

191. The acidic pH in stomach kills ingested pathogens. This contributes to them.
(A) Acquired active immunity
(B) Innate physiological barrier
(C) Innate physical barrier
(D) Acquired passive immunity

192. Maximum antigen-binding sites are found on
(A) IgA (B) IgM
(C) IgE (D) IgD

193. Monoclonal antibodies
(A) Bind to different epitopes of an antigen
(B) Bind to the same epitope of an antigen
(C) Are produced by cytotoxic T-cells
(D) Bind specifically to bacterial antigens only

194. Read the following statements. Which of the following statements are incorrect?
(i) Innate immunity is also called specific immunity.
(ii) Passive immunity is slow and takes time to give its full effective response.
(iii) Lymph nodes serve to trap the microorganism or other antigens which happen to get into lymph and tissue fluid.
(iv) The tail portion of immunoglobulin comprising the two heavy chains is called the Fab.
(v) Haptens are partial antigens.
(A) (i) and (iii) (B) (ii) and (v)
(C) (i), (ii) and (iv) (D) (iii) and (v)

195. Chikungunya is cause by a :
(A) Protozoa (B) Virus
(C) Bacteria (D) Fungus

196. What are the common symptoms of Dengue fever?
(A) Cough, sore throat, and runny nose
(B) High fever, joint pain, rash, and bleeding
(C) Headache and dizziness
(D) Muscle cramps and fatigue

197. Consumption of this causes increase in the fat synthesis, dilation of blood vessels, low blood sugar and stomach-inflammation
(A) drug addiction
(B) alcohol
(C) tobacco
(D) drug addiction and tobacco

198. During HIV infection, which glycoprotein molecules present on envelope of virus help in attaching CD-4 receptors of helper T-cells?
(A) Gp-41 (B) Gp-120
(C) Gp-160 (D) Gp-17

199. Which of the following statements are correct regarding cancer?
(i) Mutations in tumour suppressor genes are linked with cancer.
(ii) Cancer cells have low telomerase activity.
(iii) Radiotherapy involves irradiation of cancer cells to destroy their genetic material.
(iv) Alpha interferons are used for treatment.
(v) Non-ionizing radiations like X-rays and gamma rays cause DNA damage leading to neoplastic transformation.
(A) (i), (ii) and (iii)
(B) (i), (iii) and (iv)
(C) (ii), (iii) and (v)
(D) (iii), (iv) and (v)

200. Anti-retroviral therapy is given to HIV positive patients with drugs like azidothymidine. These drugs
(A) Can completely cure the patient
(B) Are totally ineffective
(C) Can prolong life and improve quality of life but cannot prevent death
(D) Can eliminate HIV from body if treatment is started within 2 weeks of infection