01. An astronaut accidentally gets separated out of his small spaceship accelerating inter – stellar space at a consant acceleration of 120 m/s². What is the acceleration of the astronaut at the instant he is outside the spaceship ?
    (1) 120 m/s²
    (2) 10 m/s²
    (3) Zero
    (4) Can be anything

02. A medical suspension bottle is shaken well to disperse the sediment uniformly and immediately, the bottle is placed on a digital weighing machine gently. If W be the actual combined weight of the bottle and the medicine, then the weight recordded by the weighing machine immediately after placing the bottle will be:
    (1) more than W
    (2) less than W
    (3) equal to W
    (4) Nothing can be said

03. The system shown in the figure is in equilibrium and all the blocks are at rest. Assume that masses of the strings, the pulley and the spring are negligible wrt the masses of the blocks and friction is absent. Find the acceleration of the block C (in m/s²), just after cutting the string 1.
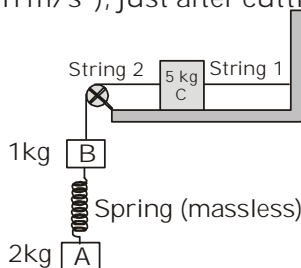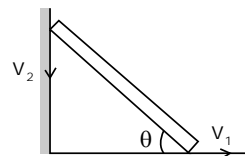

    (1) g
    (2) g/2
    (3) g/4
    (4) 0.

04. Lift is acceleration upwards by 2 m/s². Calculate tension in the string : (g=10m/s²)
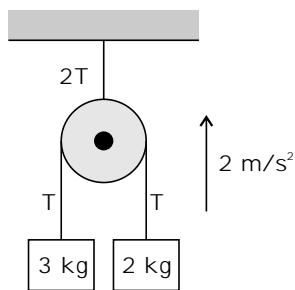

    (1) 14.4N
    (2) 57.6N
   (3) 28.8N
    (4) 7.2 N.

05. A rod is sliding against a vertical smooth wall. Calculate the relation between v_1 and v_2 :\

    (1) $\dfrac{v_1}{v_2} = \cot\theta$
    (2) $\dfrac{v_1}{v_2} = \tan\theta$
    (3) $\dfrac{v_1}{v_2} = \cos\theta$
    (4) $\dfrac{v_1}{v_2} = \sin\theta$.

06. A U-shaped smooth wire has a semicircular bending between A and B as shown in the figure. A bed of mass m moving with uniform speed v through the wire enters the semicircular bend at A and leaves at B. The average force, exerted by the bead on the part AB of the wire, is :
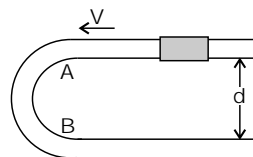
    (1) 0
    (2) $\dfrac{4mv^2}{\pi d}$
    (3) $\dfrac{2mv^2}{\pi d}$
    (4) None of these.

07. A small block of mass m_1 = 2kg is placed at rest on a large block of mass m_2 = 3 kg as shown in the Fig. The coefficient of friction between the two blocks is $\mu = 0.3$ and the horizontal surface is smooth.
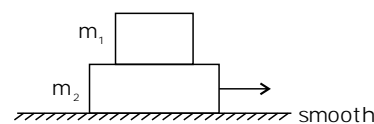
    A constant horizontal force F is applied on the lower block :
    What is the magnitude of maximum friction force acting between the two blocks?
    (1) 6N
    (2) 12 N
    (3) 18 N
    (4) 15 N

08. A block of mass m = 2kg was abandoned on the inclined surface of a prism of triangular cross section, of mass M = 4kg, as the figure shows. Find the smallest coefficient of friction μ allowed between the ground and the prism so that it does not move to the left during the descent of the block. Dismiss any friction between the block and the prism. Assume g = 10m/s^2 :

15m

15 m
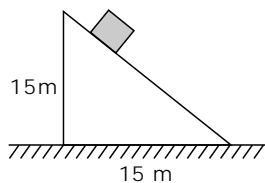
(1) $\mu = 0.5$ (2) $\mu = 0.2$

(3) $\mu = 0.6$ (4) $\mu = 0.3$.

09. In the figures shown, find acceleraton of block

$20\sqrt{2}N$

45°

6kg

$\mu_s = 0.2$

$\mu_k = 0.1$
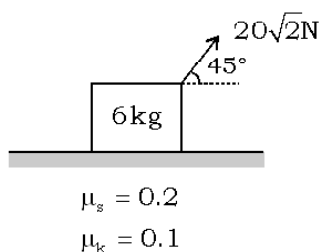
(1) 8/3 m/s^2 (2) 5/3 m/s^2

(3) 4/3 m/s^2 (4) None

10. A 2kg block is pressed against a rough wall by a force F = 20 N as shown in figure. Find acceleration of the block and force of friction acting on it. (Take g = 10 m/s^2)


20 N → 2 kg $\mu_s = 0.8$ $\mu_k = 0.6$

Wall
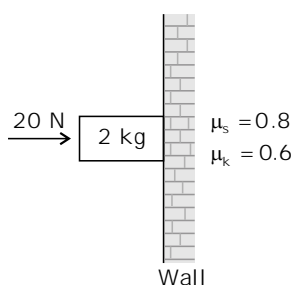
(1) 2m/s^2, 12 N   (2) 4m/s^2, 12 N

(3) 0m/s^2, 12 N   (4) 3m/s^2, 12 N

11. Select incorrect option

(1) Static and kinetics friction is self adjusting in nature.

(2) In the case of static friction, relative velocity between contact surfaces is zero.

(3) In the case of static friction, relative acceleration between contact surfaces is zero.

(4) Static friction is just like cold wielding between contact surfaces.

12. A small body A starts sliding off the top of a smooth sphere of radius R. Find the angle θ(see the figure) corresponding to the point at which the body breaks off the sphere, as well as the break – off velocity of the body

A

θ R
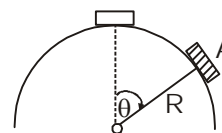
(1) $\cos\theta = \dfrac{2}{3}$ (2) $v = \sqrt{\dfrac{2gR}{3}}$

(3) $v = \sqrt{\dfrac{gR}{3}}$ (4) Both (1) & (2)

13. A solid body roates about a stationary axis according to the law $\varphi = at - bt^3$, where a = 6.0 rad/s and b = 2.0 rad/s^3. Find : the mean value of the angular velocity over the time interval between t =0 and the complete stop

(1) ω_{av} = 4 rad/s   (2) ω_{av} = 2 rad/s

(3) ω_{av} = 1 rad/s   (4) ω_{av} = 5 rad/s

14. A particle starts circular motion from rest. Its speed changes at a rate of 2 m/s^2. Calculate its acceleraton after half revolution.

(1) $\sqrt{20}$ (2) 4π

(3) 2   (4) $\sqrt{16\pi^2 + 4}$.

15. The figure show a sphere of mass m hanging at equilibrium by two ideal wires 1 and 2. In such circumstances, the tension in wire 2 is T_A. Suddenly, wire 1 is cut and the tension in wire 2, just after cutting, becomes T_B. The ratio T_A/T_B is :
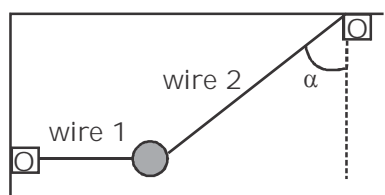
(1) 1
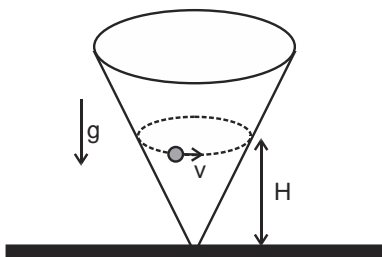(2) $\sin^2\alpha$
(3) $\sec^2\alpha$
(4) $\tan\alpha$.

16. A small sphere of mass m depicts a uniform circular motion inside the fixed cone, supported on its smooth internal wall in a place where the gravity is g. The orbit is contained in a horizontal plane at a constant height H in from the ground. The velocity of this small sphere is given by:


(1) $\sqrt{g.H}$
(2) $\sqrt{2.g.H}$
(3) $\sqrt{\dfrac{g.H}{2}}$
(4) $\sqrt{\dfrac{2g.H}{3}}$.

17. The figure shows a carrousel of radius R = 1.5 m rotating around its central axis. A mast fixed to its periphery holds a pendulum of length L = 10 m that rotates attached to the carrousel, having an angle α = 37° with the vertical. Determine the rotational angular velocity ω of the system (sin 37° =0.6)
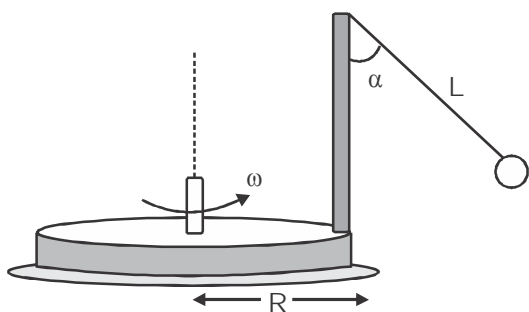
(1) 1 rad/s
(2) 2 rad/s
(3) 3 rad/s
(4) 4 rad/s

18. A bucket of mass M is pulled up from a well of depth h. Find the work done by tension of the rope on the bucket if it is pulled up with a constant acceleration of g/4.
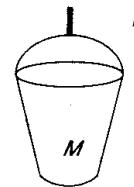
(1) $\dfrac{5}{6}Mg.h$
(2) $\dfrac{5}{8}Mg.h$
(3) $\dfrac{4}{5}Mg.h$
(4) $\dfrac{5}{4}Mg.h$

19. A pendulum has a string of length L and a bob of mass m. It is pulled by a constant horizontal force F. Find the work done by the gravity by the time the pendulum deflects through an angle θ.
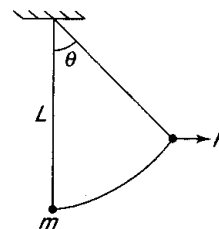
(1) $mgL(1-\cos\theta)$
(2) $-mgL(1-\cos\theta)$
(3) $-mgL(1-\sin\theta)$
(4) $mgL(1-\sin\theta)$

20. A particle is constrained to move along x-axis. It is acted upon by a force $F_x = F_0\left(\dfrac{x}{x_0}-1\right)$ where F_0 and x_0 are constants. Find the work done by the force when the particle moves from x = 0 to x = $3x_0$.

(1) $\dfrac{3}{2}F_0x_0$
(2) $\dfrac{5}{2}F_0x_0$
(3) $\dfrac{3}{4}F_0x_0$
(4) $\dfrac{3}{8}F_0x_0$

21. A uniform chain of mass M and length L rest on a rough horizontal table such that one of its ends hangs over the edge. The chain begins to slide of length of overhanging part is at least equal to half the length of the chain. Chain is released from a position where half its length is overhanging. Find the work done by the friction force acting on the chain by the moment it completely slides off the table.
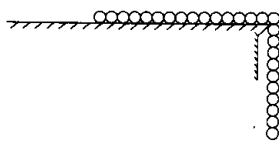

(1) $-\dfrac{MgL}{4}$ (2) $-\dfrac{MgL}{16}$

(3) $-\dfrac{MgL}{8}$ (4) $-\dfrac{MgL}{2}$

22. A particle experiences a force given by $\vec{F} = (yx^2)\hat{i} + (xy^2)\hat{j}$ as it moves in xy plane. Find the work done by the force as the particle moves from (0, 0) to (a, a) along straight line y = x

(1) $\dfrac{a^4}{2}$ (2) $\dfrac{17a^4}{35}$

(3) $\dfrac{a^4}{4}$ (4) Zero

23. A particle is constrained to move along x-axis. x component of force acting on it varies according to the graph shown. Find the work done by the force as the particle moves from x = –6m to x = +9m.
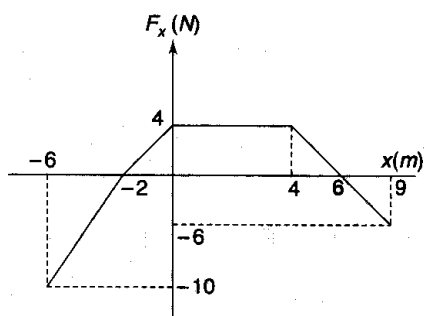
(1) –5J (2) 15 J
(3) 20 J (4) 30 J

24. A particle moves under the influence of a conservative force only along the x-axis. The potential energy U(x) of the particle is given by U(x) = 20 (x – 4)^2 J. where x is in metres. At x = 2m, the kinetic energy of the particle is 100 J. What is the maximum kinetic energy of the particle?
(1) 180J (2) 360 J
(3) 90 J (4) None of these

25. Potential energy of a particle moving in xy plane is given by (a and b are constants)
U = ax^2 + by^2
Find the force when particle is at (a, b).

(1) $\vec{F} = -a^2\hat{i} - 2b^2\hat{j}$ (2) $\vec{F} = -a^2\hat{i} - b^2\hat{j}$

(3) $\vec{F} = -2a^2\hat{i} - 2b^2\hat{j}$ (4) None of these

26. A block of mass *m* is released from the top of a smooth incline plane of inclination angle θ. Length of the incline is *l*. Find the power of the gravitational force acting on the block just before it reaches the horizontal ground.

(1) $mg\sqrt{2gl\sin\theta}.\sin^2\theta$ (2) $mg\sqrt{2gl\sin\theta}.\sin\theta$
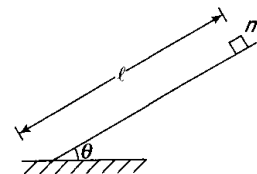
(3) $mg\sqrt{2gl\cos\theta}.\sin\theta$ (4) None of these

27. There are three identical capacitors, each of capacitance C are connected as shown. The emf of the cell connected is ε. Find the charge flows through the switch when it is closed.
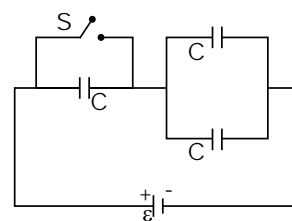
(1) $2C\varepsilon$ (2) $2C\varepsilon/3$
(3) $4C\varepsilon/3$ (4) none

28. Three large plates are given charges as shown in figure. If the cross-sectional are of each plate is the same, then find charge on both sides of plate C.

Q   -5Q   10Q

A   B   C
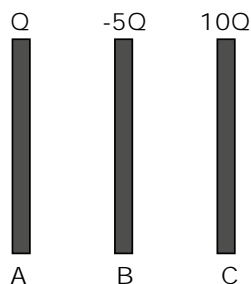
(1) 7Q, 3Q   (2) 7Q, 7Q
(3) 3Q, 3Q   (4) 5Q, 5Q

29. In the circuit shown, when switch is closed, the capacitor charge at a time constant xRc. Find the value of x.

(1) 1   (2) 2
(3) 3   (4) 1.5

30. In the circuit shown, A and B are equal resistances when S is closed, the capacitor C charges from the cell of emf ε and reaches a steady state :
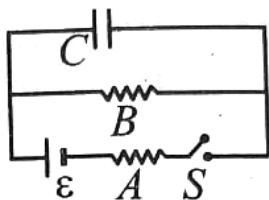
(1) Initially current in A is greater than B
(2) At steady state current in A is equal to current in B

(3) In steady state, energy stored in capacitor is
$\frac{1}{8}C\varepsilon^2$

(4) All of the above

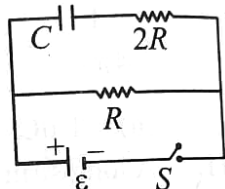31. Five identical plates of equal area A are placed parallel to and at equal distance d from each ther as shown in figure. The effective capacity of the system between the terminal A and B is :

(1) $\dfrac{3}{5}\dfrac{\epsilon_0\,A}{d}$ (2) $\dfrac{5}{4}\dfrac{\epsilon_0\,A}{d}$
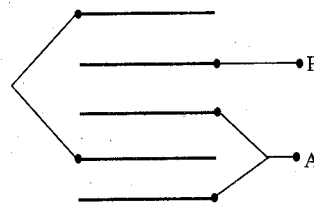
(3) $\dfrac{5}{3}\dfrac{\epsilon_0\,A}{d}$ (4) $\dfrac{4}{5}\dfrac{\epsilon_0\,A}{d}$

32. In the given circuit, if point C is connected to the earth and a potential of + 2000 V is given to the point A, the potential at B is

10 µF   10 µF

5 µF

A• $\dashv\vdash$ B

10 µF
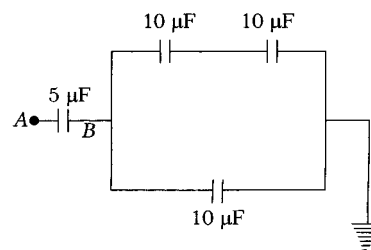
(1) 1500V   (2) 1000V
(3) 500 V   (4) 400V

33. Two circular coils X and Y, having equal number of turns, carry equal currents in the same sense and subtend same solid angle at point O. If the smaller coil X is mid – way between O and Y, then if we represent the magnetic induction due to bigger coil Y at O as B_y and that due to smaller coil X at O as B_x, then
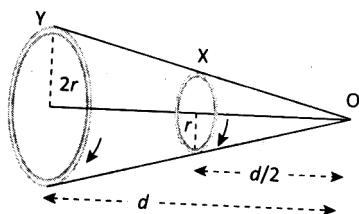
(1) $\dfrac{B_Y}{B_X} = 1$

(2) $\dfrac{B_Y}{B_X} = 2$

(3) $\dfrac{B_Y}{B_X} = \dfrac{1}{2}$

(4) $\dfrac{B_Y}{B_X} = \dfrac{1}{4}$.

34. A proton of mass 1.67×10^{-27} kg and charge 1.6×10^{-19} C is projected with a speed of 2×10^6 m s^{-1} at an angle of 60° to the x – axis . If a uniform magnetic field of 0.104 T is applied along y– axis, the path of proton is :

(1) a circle of radius 0.2 m and time period $\pi \times 10^{-7}$ s.

(2) a circle of radius 0.1 m and time period $2\pi \times 10^{-7}$ s.

(3) a helix of radius = 0.1 m and time period $2\pi \times 10^{-7}$s

(4) a helix of radius = 0.2 m and time period $4\pi \times 10^{-7}$ s.

35. A fixed horizontal wire carries a current of 200 A. Another wire having a mass per unit length 10^{-2} kgm^{-1} is placed below the first wire at a distance of 2 cm and parallel to it. How much current must be passed through the second wire if it floats in air without any support ? What should be the direction of current in it?

(1) 25A (direction of current is same to first wire)

(2) 25 A (direction of current is opposite to first wire)

(3) 49 A (direction of current is same to first wire)

(4) 49 A (direction of current is opposite to first wire)

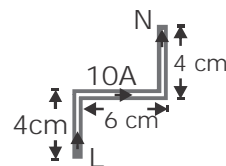36. A current carrying wire LN is bent in the form as shown in the figure. If wire carries a current of 10A and it is placed in a magnetic field of 5T which acts perpendicular to the paper outwards then it will experience a force

(1) Zero

(2) 5 N

(3) 30 N

(4) 20 N.

37. Figure shows the cross – sectional view of the hollow cylindrical conductor with inner radius R and outer radius 2R, cylinder carrying uniformly distributed current along its axis. The magnetic induction at point P at a distance $\dfrac{3R}{2}$ from the axis of the cylinder is :

(1) Zero

(2) $\dfrac{5\mu_0 I}{72\pi R}$

(3) $\dfrac{7\mu_0 I}{18\pi R}$
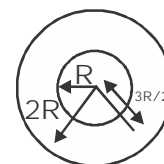
(4) $\dfrac{5\mu_0 I}{36\pi R}$.

38. A large metal sheet carries an electric current along its surface. Current per unit length is λ. Magnetic field near the metal sheet is
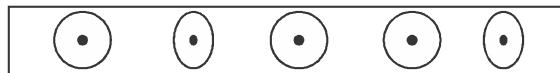
(1) $\dfrac{\mu_0 \lambda}{2}$

(2) $\dfrac{\lambda \mu_0}{2\pi}$

(3) $\lambda \mu_0$

(4) $\dfrac{\mu_0}{2\lambda \pi}$.

39. A thin circular wire carrying a current I has a magnetic moment m. The shape of the wire is changed to a square and it carries the same current. It will have a magnetic moment :

(1) m

(2) $\dfrac{4}{\pi^2} m$

(3) $\dfrac{4}{\pi} m$

(4) $\dfrac{\pi}{4} m$.

40. The figure shows three equal currents i (two parallel and one antiparallel) and four Amperian loops. Rank the loops according to the magnitude of $\oint \vec{B}.\vec{dl}$ along each, greatest first.
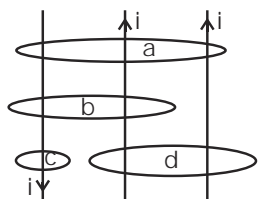
(1) $d > a = c > b$

(2) $b > a = c > d$

(3) $a = a > d > b$

(4) All have same value

Passage (41 to 42)

A moving coil galvanometer has coil of area A and number of turns N. The moment of inertia of the coil and cylinder assembly about the rotation axis is I. The radial magnetic field in the space has strength B. It is observed that the coil rotates by an angle of $\dfrac{\pi}{2}$ in equilibrium position when a current i_0 is passed through it. The spring attached to the cylinder has an unknown torsional constant (C). When the spring is twisted by an angle θ, the torque the is developed is $C\theta$.

41. The torsional constnat (C) of the psring can be expressed

(1) $\dfrac{NBi_0A}{\pi}$

(2) $\dfrac{2NBi_0A}{\pi}$

(3) $\dfrac{NBi_0A}{2\pi}$

(4) $\dfrac{2NBi_0A}{3\pi}$

42. If a charge Q is passed suddenly through the galvanometer coil, the maximum deflection that the coil will suffer before its oscillation is damped is

(1) $Q\sqrt{\dfrac{\pi NBA}{2Ii_0}}$

(2) $Q\sqrt{\dfrac{NBAi_0}{\pi I}}$

(3) $Q\sqrt{\dfrac{2NBA}{\pi Ii_0}}$

(4) $Q\sqrt{\dfrac{3NBA}{\pi I}}$

43. The desirable properties for making permanent magnets are :
(1) high retentivity and high coercive force
(2) high retantivity and low coercive force
(3) low retentivity and high coercive force
(4) low retentivity and low coercive force.

44. A magnetic dipole of magnetic moment $0.72\sqrt{2}$ Am^2 is placed horizontally with the north pole pointing towards east. Find the position of the neutral point if the horizontal component of the earth's magnetic field is $18\mu T$.

(1) 20 cm from the dipole, $\tan^{-1}\sqrt{2}$ south of east

(2) 20 cm from the dipole, $\tan^{-1}\sqrt{2}$ north of west

(3) 20 cm from the dipole, $\tan^{-1}\sqrt{2}$ south of west

(4) Neutral point does not exist

45. When a ferromagnetic material goes through a hysteresis loop, the magnetic susceptibility :
(1) may be zero   (2) may be infinity
(3) may be negative   (4) All of the above

46. According to law of mass action rate of a chemical reaction is proportional to
(1) concentration of reactants
(2) molar concentration of reactants
(3) concentration of product
(4) molar concentration of product

47. Which of the these does not influence the rate of reaction
(1) Natural of the reactants
(2) concentration of the reactants
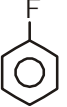(3) Temperature of the reaction
(4) molecularity of the reaction

48. For reaction $2N_2O_5 \rightarrow 4NO_2 + O_2$ the rate is directly proportional to $[N_2O_5]$. AT $45^0 C$, 90% of the N_2O_5 reacts in 3600 sec. The value of the rate constant is

(1) $3.2 \times 10^{-4}\,s^{-1}$　　　(2) $6.4 \times 10^{-4}\,s^{-1}$

(3) $8.5 \times 10^{-4}\,s^{-1}$　　　(4) $12.8 \times 10^{-4}\,s^{-1}$

49. If 60 % of first order reaction was complete in 60 min. 50 % of the same reaction would be completed in approximately

    (1) 45 min　　　　　(2) 60 min

    (3) 40 min　　　　　(4) 50 min

50. The half life period for a first order reaction is

    (1) Independent of concentration

    (2) proportional to concentration

    (3) inversely proportional to concentration

    (4) None of these

51. The value of rate constant for a first order reacton is $2.303 \times 10^{-2}\,s^{-1}$ what will be the time required to reduce the concentration to 1/10th of Its initial concentration.

    (1) $100\,sec$　　　　(2) 10 sec

    (3) 2303 sec　　　　(4) 23.03 sec

52. Unit of specific reaction rate for second order reaction

    (1) s^{-1}　　　　　(2) $mol\,L^{-1}s^{-1}$

    (3) $L^2 mol^{-2}s^{-1}$　　(4) $L\,mol^{-1}s^{-1}$

53. For a first order reaction. The time taken to reduce the initial concentration by a factor of 1/4 is 20 min. The time required to reduce initial concentration by a factor of 1/16 is

    (1) 20 min　　　　　(2) 10 min

    (3) 80 min　　　　　(4) 40 min

54. Which one of the following is wrong about molecularity of a reaction

    (1) It may be whole number or fractional

    (2) It is calculated from reaction mechanism

    (3) It is always equal to the order of elementary reaction.

    (4) All of these

55. A chemical reaction proceeds into the following steps

    Step I.　$2A \rightleftharpoons X$　fast

    Step II.　$X + B \rightleftharpoons Y$　slow

    Step III.　$Y + B \rightleftharpoons$ Product fast

    The law for the overall reaction is

    (1) rate $= k[A]^2$　　　(2) rate $= k[B]^2$

    (3) rate $= K[A][B]$　　(4) rate $= k[A]^2[B]$

56. Which of the following is correct w.r.t. the extent of overlapping from different shell numbers of joining atoms ?

    (1) $s-s > s-p > p-p$　(2) $s-p > s-s > p-p$

    (3) $p-p > s-p > s-s$　(4) $s-s > p-p > s-p$

57. The correct order of increasing $C-O$ bond length in CO, CO_3^{2-} and CO_2 is :

    (1) $CO_3^{2-} < CO_2 < CO$　(2) $CO_2 < CO_3^{2-} < CO$

    (3) $CO < CO_3^{2-} < CO_2$　(4) $CO < CO_2 < CO_3^{2-}$

58. Hybridization of boron in BH_3 and B_2H_6 respectively are :

    (1) sp^2, sp^2　　　　(2) sp^3, sp^3

    (3) sp^2, sp^3　　　　(4) sp^3, sp^2

59. The correct electronic polarisation structure of acrolein (acraldehyde) is :

    (1) $\overset{\delta+}{C}H_2 = CH - CH = \overset{\delta-}{O}$　(2) $\overset{\delta+}{C}H_2 = \overset{\delta+}{C}H - CH = O$

    (3) $\overset{\delta-}{C}H_2 = CH - \overset{\delta+}{C}H = O$　(4) $\overset{\delta-}{C}H_2 = CH - CH = \overset{\delta+}{O}$

60. O_2 and N_2 if converted to O_2^+ & N_2^+ respectively. Which of the following is not correct ?

    (1) Electron in O_2 goes from π^*_{2py}

(2) Electron in N_2 goes from σ_{2pz}

(3) Bond length $_{O-O} >$ bond length $(O-O)^+$

(4) Bond length $_{N-N} >$ bond length $(N-N)^+$

61. If ℓ_p stands for lone pair and bp for bond pair, which of the following is correct order for repulsive forces ?

(1) $bp - bp > \ell p - bp > \ell p - \ell p$

(2) $\ell p - \ell p > \ell p - bp > bp - bp$

(3) $\ell p - bp > \ell p - \ell p > bp - bp$

(4) $bp - \ell p > \ell p - bp > \ell p - \ell p$

62. In which of the following pairs the two species have similar geometry ?

(1) BF_3, NH_3 (2) CO_2, C_2H_2

(3) CO_2, SO_2 (4) CH_4, BF_3

63. Which of the following order is correct for the dipole moments of dichlorobenzenes ?
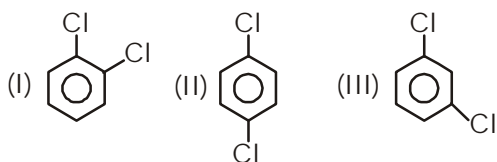
(1) $I > II > III$ (2) $III > II > I$

(3) $I > III > II$ (4) $III > I > II$

64. has dipole moment x Debye. Which of the following is correctly matched for its dipole moment ?

(1) ; $\mu = 3x$ (2) ; $\mu = x$

(3) ; $\mu = 2x$ (4) ; $\mu = 4x$
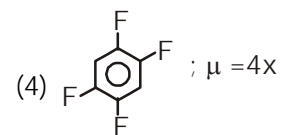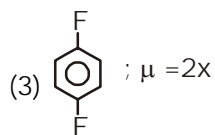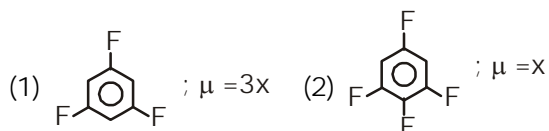
65. Electronegativities of atoms A and B are 1.20 and 4.0 respectively. The percentage ionic character of $A-B$ bond is :

(1) 25 %   (2) 48 %

(3) 65.24 %   (4) 72.24 %

66. In the electrochemical cell :

$Zn \mid ZnSO_4(0.01M \parallel CuSO_4(1.0M) \mid Cu$, the emf of this Daniell cell is E_1 . When the concentration of $ZnSO_4$ is changed to 1.0 M and that of $CuSO_4$ changed to 0.01 M, the emf changes to E_2 . From the followings, which one is the relationship between E_1 and E_2 ? (Given, RT/F=0.059)

(1) $E_1 < E_2$ (2) $E_1 > E_2$

(3) $E_2 = 0 \neq E_1$ (4) $E_1 = E_2$

67. Which is the correct order of increasing oxidising ability ?

(1) $Pb^{2+} < Ni^{2+} < Cr^{3+} < Al^{3+}$

(2) $Al^{3+} < Cr^{3+} < Ni^{2+} < Pb^{2+}$

(3) $Cr^{3+} < Al^{3+} < Ni^{2+} < Pb^{2+}$

(4) $Ni^{2+} < Pb^{2+} < Al^{3+} < Cr^{3+}$

68. Consider the following equation for a cell reaction

$A + B \rightleftharpoons C + D$ $E^0 = x$ volt, $K_{eq} = K_1$

$2A + 2B \rightleftharpoons 2C + 2D$; $E^0 = y$ volt, $K_{eq} = K_2$

then

(1) $x = y$, $K_1 = \dfrac{1}{K_2}$ (2) $x = y$, $K_1 = K_2^2$

(3) $x = y$, $K_2 = K_1^2$ (4) $x = 2y$, $K_1 = 2K_2$

69. Molar ionic conductivities of a bivalent electrolyte are 57 and 73. The molar conductivity of the solution will be

    (1) 130 S cm^2 mol^{-1} (2) 62 S cm^2 mol^{-1}

    (3) 260 Scm^2 mol^{-1} (4) 187 Scm^2 mol^{-1}

70. Three faradays electricity was passed through an aqueous solution of iron (II) bromide. The weight of iron metal (at. wt. = 56) deposited at the cathode (in g) is

    (1) 56   (2) 84

    (3) 112   (4) 168

71. Zinc is used to protect iron from rusting because

    (1) E^0_{red} of Zn $> E^0_{red}$ of Fe

    (2) E^0_{ox} of Zn $> E^0_{ox}$ of Fe

    (3) zinc does not melt easily

    (4) zinc is cheap

72. Which of the following solutions has the highest equivalent conductance ?

    (1) 0.01M NaCl   (2) 0.050 M NaCl

    (3) 0.005M NaCl   (4) 0.02M NaCl

73. Three Faradays of electricity are passed through molten Al_2O_3, aqueous solution of $CuSO_4$ and molten NaCl taken in three different electrolytic cells. The amount of Al, Cu and Na deposited at the cathodes will be in the ratio of-

    (1) 1 mole : 2 mole : 3 mole

    (2) 1 mole : 1.5 mole : 3 mole

    (3) 3 mole : 2 mole : 1 mole

    (4) 1 mole : 1.5 mole : 2 mole

74. Charge in coulombs is equal to-

    (1) $\dfrac{\text{Faraday}}{\text{av. number}}$

    (2) Faraday × av. number

    (3) $\dfrac{\text{av.number}}{\text{Faraday}}$

    (4) None of these

75. The standard electrode potential of Zn, Ag and Cu are –0.76, 0.80 and 0.34 volt respectively; then -

    (1) Ag can oxidise Zn and Cu

    (2) Ag can reduce Zn^{2+} and Cu^{2+}

    (3) Zn can reduce Ag$^+$ and Cu^{2+}

    (4) Cu can oxidise Zn and Ag

76. For the equilibrium $NH_4HS(s) \rightleftharpoons NH_3(g) + H_2S(g)$,

    (1) $K_p = \dfrac{1}{2}p$ (2) $K_p = \dfrac{1}{4}p$

    (3) $K_p = \dfrac{1}{4}p^2$ (4) $K_p = \dfrac{1}{2}p^2$

77. Let K_1 and K_2 be the equilibrium constants for the reaction (1) and (2).

    $$N_2(g) + O_2(g) \rightleftharpoons 2NO(g) \qquad ------(1)$$

    $$NO(g) \rightleftharpoons \dfrac{1}{2}N_2(g) + \dfrac{1}{2}O_2(g) \qquad ----- (2)$$

    Then

    (1) $K_1 = \left(\dfrac{1}{K_2}\right)^2$ (2) $K_1 = K_2^2$

    (3) $K_1 = \dfrac{1}{K_2}$ (4) $K_1 = (K_2)^0$

78. For the equilibrium

    $$2NO_2(g) \rightleftharpoons N_2O_4(g) + 14.6 \text{ kcal}$$

    increase in temperature would

    (1) favour the formation of N_2O_4

    (2) favour the decomposition of N_2O_4

    (3) not alter the equilibrium

    (4) stop the reaction

79. In which of the following reaction is K_p less than K_c ?

(1) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$

(2) $CO(g) + 2H_2(g) \rightleftharpoons CH_3OH(g)$

(3) $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$

(4) $I_2(g) \rightleftharpoons 2I(g)$

80. 2 mol each of A and B are taken in a container where the following reaction takes place.

$$2A(g) + B(g) \rightleftharpoons 2C(g) + 2D(g)$$

When the system attains equilibrium,

(1) $[A] > [B]$

(2) $[A] < [B]$

(3) $[A] = [B]$

(4) none of the above holds

81. The equilibrium constant K for the reaction $2HI(g) \rightleftharpoons H_2(g) + I_2(g)$ at room temperature is 2.85 an that at 698 K is 1.4×10^{-2}.

This implies that

(1) HI is the exothermic compound

(2) HI is very stable at room temperature

(3) HI is relatively less stable than H_2 and I_2

(4) HI is resonance stablized

82. For the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, the value of the equilibrium constant is 48.0. If the volume of the container is reduced to one-sixth of its initial volume, the equilibrium constant will be

(1) 8.0

(2) 16.0

(3) 48.0

(4) 288.0

83. The solubility product of Hg_2I_2 is

(1) $\left[Hg_2^{2+}\right]\left[I^-\right]^2$

(2) $\left[Hg^+\right]^2\left[I^-\right]^2$

(3) $\left[Hg_2^{2+}\right]^2\left[I^-\right]^2$

(4) $\left[Hg_2^{2+}\right]^2\left[I^-\right]$

84. A 0.1 M solution of which of the folowing substances will be basic ?

(1) Sodium borate

(2) Ammonium chloride

(3) Calcium nitrate

(4) Sodium sulphate

85. Which of the following is a buffer solution ?

(1) $CH_3COOH + CH_3COONa$

(2) $CH_3COOH + CH_3COONH_4$

(3) $CH_3COOH + NH_4Cl$

(4) $NaOH + NaCl$

86. Which one of the following is true any diprotic acid, H_2X ?

(1) $K_{a_1} = K_{a_2}$

(2) $K_{a_1} > K_{a_2}$

(3) $K_{a_2} > K_{a_1}$

(4) $K_{a_2} = 1/K_{a_2}$

87. M_2SO_4 (M^+ is monovalent metal ion) has a K_{sp} of 3.2×10^{-5} at 298.15 K. The maximum concentration of SO_4^{2-} ions possible in a saturated solution of this solid at 298.15 K is

(1) 3.0×10^{-4} M

(2) 2.0×10^{-3} M

(3) 4.0×10^{-3} M

(4) 1.5×10^{-5} M

88. The pH of 0.1 acetic acid is found to be 2.87. How will the addition of a small crystal of sodium acetate change the pH ?

(1) It will decreaase the pH

(2) It will increase the pH

(3) it will have no effect on the pH

(4) Nothing can be predicted

89. An aqueous solution contians 0.01M of NaCl, NaBr and NaI of 1.01M solution of $AgNO_3$ solution a gradually added to this halide mixture. What will happen ?

(1) AgCl will be precipitated first.

(2) AgI will be precipitated first.

(3) Both AgCl and AgBr will be precipitated simultaneously.

(4) All of AgI, AgBr, and AgCl will be precipated at the same time.

90. Which of the following acids is monoprotic in an aqueous solution having $pK_a = 9.2$?

(1) H_3PO_3 (2) H_3BO_3

(3) H_3PO_2 (4) H_3PO_4

91. Which of the following alcoholic drink is obtain without distillation ?
(1) Whisky   (2) wine
(3) Brandy   (4) Rum

92. Biogas is the mixture of gases produced by the microbial activity. The type of the gas produced depend upon :
(1) Type of Digester used
(2) Size of digester
(3) Type of organic waste
(4) BOD of substrate

93. Given pedigree shows inheritance of autosomal recessive gene. What is the genotype of given parents X & Y respectively ?
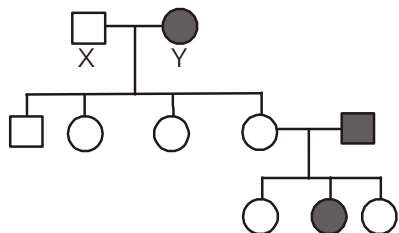
(1) AA,aa   (2)aa, AA
(3) aa, Aa   (4) Aa, Aa

94. Match the column – I with column – II and select the correct option from codes given below :

Column – I	Column – II
(A) Autopolyploidy	(i) 2n + 1
(B) Trisomy	(ii) AAAA
(C) Allopolyploidy	(iii) AABB
(D) Nullisomy	(iv) 2n – 1– 1
	(v) 2n – 2

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

95. A chemical used in organ – transplant patients to suppress the immune :
(1) Somatosatins   (2) Statins
(3) Cyclosporin A   (4) Streptokinase

96. Study the following statements regarding lactic acid bacteria (LAB) which are used to convert milk into curd.
(i) They produce acids that coagulate and partially digest the milk proteins

(ii) A small amount of curd added to the fresh milk as an inoculum contains millions of LAB, which at suitable temperature, multiply and convert milk into curd
(iii) conversion of milk into curd improves its nutritional quality by increasing vitamin B_6.
(iv) LAB may result in acidity in the stomach of human beings
which of the above statements are corrects ?
(1) (i), (ii) and (iii)   (2) (ii) and (iii)
(3) (i) and (ii)   (4) (i), (ii), (iii) and (iv)

97. When a violet flower of unknown genotype is crossed with whilte flower, the progeny are violet and white in equal proportion. Then read the following statements :
(i) This is callled test cross
(ii) Unknown flower is homozygous
(iii) Unknown flower is heterozygous
(iv) This test used to determine the phenotype of the plant at F_2.
(v) In test cross, violet or white flower is crossed with recessive parent instead of self – crossing.
Select the incorrect statement.
(1) iii, iv, v   (2) ii, iv
(3) i, ii, v   (4) ii, iv, v

98. In F_2 – generation of a mendelian trihybrid cross the type of phenotype and genotype are
(1) Phenotype – 4, Genotype – 16
(2) Phenotype – 8, Genotype – 4
(3) Phenotype – 16, Genotype – 64
(4) Phenotype – 8, Genotype – 27

99. The parallelism between factors and chromosome led to the formation of :
(1) Cell tncory
(2) Chromosomal theory of inheritance
(3) Linkage
(4) Pangenesis theory

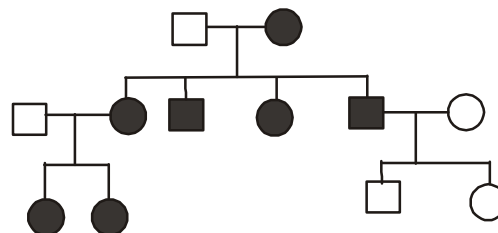100. A Holandric gene cause Hypertrichosis. When a man with hairy pinna marries a normal Woman, what percentage of their daughter would be expected to have hairy ears?
(1) 50 %   (2) 25%
(3) 75%   (4) 0%

101. A dihybrid test cross ratio for two completely linked genes is likely to be :
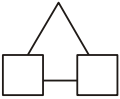(1) 1 : 1   (2) 1 : 1 : 1 : 1
(3) 7 : 1 : 1 : 7   (4) 7 :1 :1 : 1

102. Identify type of inheritance in the given Pedigree :

(1) Autosomal recessive
(2) X – linked Dominant
(3) Cytoplasmic inheritance
(4) Both (1) & (3)

103. What shall be the genotype of Embryo, Endosperm and fruit when the pollens of plant AABB are transferred to stigma of plant CC ?

	Embryo	Endosperm	Fruit
(1)	ABC	ABCC	CC
(2)	AABBCC	ABCC	AABBCC
(3)	ABC	AABBCC	CC
(4)	AABBCC	ABCC	CC

104. Use of microorganisms for the disposal of pollutants is termed as :
(1) Bioremediation
(2) Integrated organic farming
(3) Biofortification
(4) Bioprospecting

105. Select the correct statement w.r.t. organic farming :
(1) Use of phosphate bacteria
(2) Use of IPM
(3) Growing of local varieties resistant to local pest accompanied by intercropping and crop rotation with minimum use to fertilisers and pesticide
(4) use of chemical fertilisers, insecticide and pesticide

106. For getting rid of aphids and mosquitoes the biocontrol agent used is :
(1) Drangonfly and Lady bird
(2) *Bacillus thrungiensis*
(3) *Trichoderma*
(4) *Nucleopolyhedrovirus*

107. Gango Action Plan and Yamuna Action plan was initiated by
(1) Environment Policy act (EPA)
(2) Water act
(3) Ministry of Enviroment and forest
(4) NABRI

108. Technology of biogas production was developed in India mainly due to the efforts of
(1) IARI   (2) KVIC
(3) Both (1) and (2)   (4) IRRI

109. Colour blindness is a genetic disorder in which the individual fail to distinguish between :
(1) Red and Blue   (2) Red and Yellow
(3) Black and white   (4) Red and green

110. Select incorrect statement w.r.t. sickle cell anaemia
(1) Medelian disorder
(2) Autosomal recessive genetic trait
(3) $Hb^A Hb^S$ individuals are apparently unaffected but are carrier of the disease
(4) The mutant haemoglobic molecule undergoes polymerisation under higher oxygen tension

111. The inheritance of skin colour in humans is an example of
(1) Codominance
(2) Chromosomal aberration
(3) Point mutation
(4) Polygenic inheritance

112. Choose the odd statement w.r.t. the following figure

(1) This male is sterile with overall masculine development
(2) It is a mendelian disorder caused due to mutation in a gene
(3) Karyotype represent 47 : XXY
(4) Gynaecomastia

113. Method of Sex determination in Drosophila and birds are :
(1) XX – XO and XX– XY respectively
(2) XX – XY and ZZ – ZW respectively
(3) XX – XY and ZZ – ZO respectively
(4) XX – XO and ZZ – ZO respectively

114. In Pedigree analysis the symbol represents
(1) Consanguineous marriage
(2) Sex Unspecified
(3) Monozygotic twins
(4) Dizygotic twins

115. Which of the following is one of the most significant discoveries of the twentieth century that greatly contributed towards the welfare of human society ?
    (1) Penicillin
    (2) Gobar gas
    (3) Clot busters
    (4) Immunosuppresive agent

116. Which one of the following helps in absorption of phosphorus from soil by plants ?
    (1) *Anabaena*   (2) *Glomus*
    (3) *Rhizobium*   (4) *Frankia*

117. Which of the following disorder occur due to trisomy of allosomes ?
    (A) Down's Syndrome
    (B) Klinefelter's Syndrome
    (C) Edward's Syndrome
    (D) Turner's Syndrome
    Options :
    (1) A and C are correct
    (2) B and C are correct
    (3) Only B is correct
    (4) A, B and C are correct

118. The type of mutation that arises due to change in single base pair of DNA of autosome has a classic example like :
    (1) Haemophilia   (2) Colour blindness
    (3) Sickle cell anaemia   (4) Gynaecomastia

119. The 'A' allele representing the original phenotype is 'B' tpe and the 'C' allele is generally the D type allele

	A	B	C	D
(1)	Functional	Dominant	Modified	Recessive
(2)	Non functional	Recessive	Modified	Dominant
(3)	Unmodified	Recessive	Modified	Dominant
(4)	Non functional	Dominant	Functional	Recessive

120. What is correct for the F_2 generation of Mendelian dihybrid cross.
    (1) Recessive trait is present in 1/2 frequence
    (2) Recombinant plants are present in 37.5% frequency
    (3) Parental parents are present in 75% frequency
    (4) Dominant trait is present in 1/2 frequecy.

121. Identify the following figure and choose the correct option for function of labelling (A) position
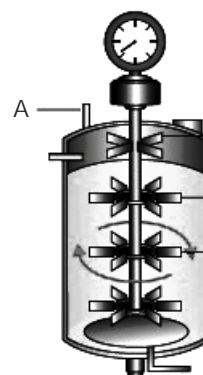
    (1) Steam for sterilisation
    (2) Foam braker
    (3) Acid / Base for pH control
    (4) To provide sterile Air.

122. Which of the following is not used as bio - fertilizer ?
    (1) Nostoc   (2) Anabaena
    (3) Bacillus thuringiensis
    (4) Rhizobium.

123. After the completion of biosynthetic pathway, the processes which include separation and purification are collectively referred to as –
    (1) up stream processing
    (2) Down stream processing
    (3) Hybridization
    (4) Transformation

124. Which gene controls the corn borers ?
    (1) Cry IAC   (2) Cry II Ab
    (3) Cry I Ab   (4) Both (1) and (3)

125. Which of the following methods involves silencing of mRNA ?
    (1) RNA transcription   (2) RNA interference
    (3) DNA replication   (4) DNA fingerprinting

126. Crystals of Bt toxin produced by source bacteria do not kill the bacteria themselves because :
    (1) Bacteria encloses toxin in a special sac
    (2) Toxin is immature
    (3) Bacteria are resistant to the toxin
    (4) Toxin is inactive.

127. Select the correct statement except :
    (1) cry genes code for Bt toxins
    (2) Genetically modified rice is rich in vitamin A
    (3) Bt cotton is resistant from the infection of Bacillus thuringiensis
    (4) During green revolution food production was tripled.

128. An analysis of chromosomal DNA using the southern hybridisation technique does not use :
    (1) Electrophoresis   (2) PCR
    (3) Blotting   (4) Autoradiography.

129. Regarding B. thuringiensis and Bt cotton, correct statements are :
     (A) Bt enters the mid gut of the pest by making pores in the epithelium
     (B) Bt produces Cry IAC protein toxin in the Bt cotton plants
     (C) Toxin protein genes of Bt are present in the genome of Bt cotton plants
     (D) cells of Bt cotton can sysnthesise cry IAC protein
     (1) C and D
     (2) A, B and C
     (3) B, C and D
     (4) B and D.

130. In E. coli cloning vector pBR 322, the restriction sites of antibiotic resistance gene tet^R are –
     (1) EcoRI and Cla I
     (2) Bam HI and Sal I
     (3) Pst I and PvuI
     (4) EcoRII and Hae III.

131. Identify the following figure and choose the correct option :
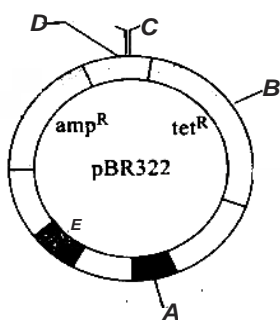
     (1) A – PvuI, B – BamHI, C – Hind II, D – EcoRI, E -ori
     (2) A – ori , B – BamHI, C – Hind I, D – EcoRI, E – PvuI
     (3) A – PvuII, B – BamHI, C – Hind III, D – EcoRI, E – ori
     (4) A – PvuII, B – HindIII, C – Bam HI, D – EcoRI,

132. Which of the following is not correctly matched ?
     (1) Biolistics – Gene gun
     (2) Restriction endonuclease – EcoRI
     (3) Taq polymerase – DNA polymerase
     (4) Ori – origin of transcription.

133. What is true for plasmid?
     (1) Plasmids are widely used in gene transfer
     (2) These are found in bacteria and virus
     (3) Plasmid contains gene for vital activites
     (4) These are main part of chromosome.

134. In ELISA, infection by pathogen can be detected by the following except :
     (1) The presence of Proteins
     (2) The presence of glycoproteins
     (3) The presence of glycolipids
     (4) The antibodies synthesised against the pathogen.

135. Which of the following process is used for in vitro amplification of "gene of interest" ?
     (1) PCR
     (2) Biolistics
     (3) Microinjection
     (4) Agarose gel electrophoresis

136. Match the columns :

Column A	Column B
1. Isolation of genetic material	A. Restriction enzyme
2. Joining of DNA fragments	B. DNA polymerase
3. PCR	C. DNA ligase
4. Cutting of palindromic DNA sequences	D. Lysozyme

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

137. _____ Protein is used to treatment of Emphysema:
     (1) α – lactalbumin
     (2) α – 1 – antitrypsin
     (3) β – 1 antitrypsin
   (4) β – lactalbumin

138. Cotton bollworms are controlled by the proteins coded by :
     (1) Cry IAC
     (2) Cry IAC and Cry II Ab
     (3) Cry I AC & Cry IAb
     (4) Cry IAC and Cry II AC

139. What is employed to check the progression of a restriction enzyme digestion :
     (1) PCR
     (2) Recombinant Protein
     (3) Palindromic nucleotide sequences
     (4) Agarose gel electrophoresis.

140. Identify the following figure and choose the correct labelling A,C, B and D respectively
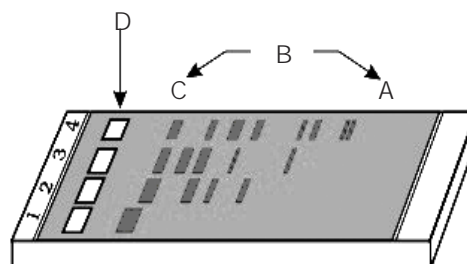
     (1) smallest parts, DNA bands, largest parts and wells
     (2) smallest parts, RNA bands, largest parts and wells
     (3) smallest parts, largest parts, DNA bands and wells
     (4) largest parts, smallest parts, RNA bands and wells.

141. Insertional activation is also technique by which slection of recombinants can be done. In this process, ...1....... substrates are used as alternative selectable marker. For example, if a recombinant DNA is inserted into the coding sequence (or gene) of the β – galactosidase enzyme in the plasmid of E.coli, the gene becomes inactiveated. In presence of ....1.... substrate, ...2........ will give blue colour while the ....3....... will give ....4......... colour.

|	1	2	3	4
(1)	Radiactive	Recombinants	Non-recombinants	Green
(2)	Radioactive	Non-recombinants	Recombinants	No
(3)	Chromogenic	Recombinants	Non-recombinants	Green
(4)	Chromgenic	Non-recombinants	Recombinants	No

142. .....A..... can transform normal animal cells into cancerous cells while ....B.... can transform the normal plant cells into tumor.

	A	B
(1)	pBR322	Retroviruses
(2)	Retriviruses	Ti plasmids
(3)	Restriction enzyme	Ti plasmids
(4)	Restriction enzyme	pBR322

143. The given figure shows some characteristic features of chordates. Identify the correct labelling A,B,C and D.
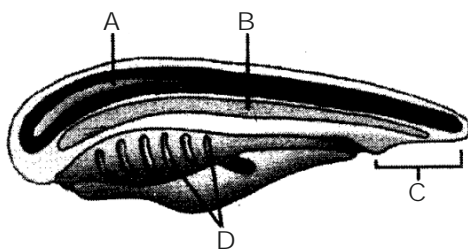
(1) A – Notochord, B – Post anal part, C – Gill slits, D – Nerve cord

(2) A – Nerve Cord, B – Notochord, C – Post anal part, D – Gill slits

(3) A – Notochord, B – Nerve cord, C – Gill slits, D – Post anal part

(4) A – Gill Slits, B – Post anal part, C – Nerve cord, D – Notochord.

144. The correct statement about RNA interference is except :

(1) Transposons can be a source of complimentary RNA

(2) Another complementary RNA molecule is added

(3) it is a method of cellular defense in all eukaryotic organisms

(4) Silencing of DNA is a major step.

145. While isolating DNA from bacteria, which of the following enzymes is not used ?

(1) Lysozyme   (2) Ribonuclease

(3) Deoxyribonuclease   (4) Protease

146. Respiratory system is firstly completed in which phylum.

(1) Arthropoda   (2) Annelida

(3) Platyhelminthes   (4) Aschelminthes

147. Which of the following statement is incorrect ?

(1) In chordates heart is ventrally located

(2) In non-chordates CNS is ventrally located

(3) In Echinoderms anus is ventrally located

(4) All are correct

148. Most common species for bee keeping (Apiculture) in India is :–

(1) Apis millifera   (2) Apis indica

(3) Apis dorsata   (4) All of these
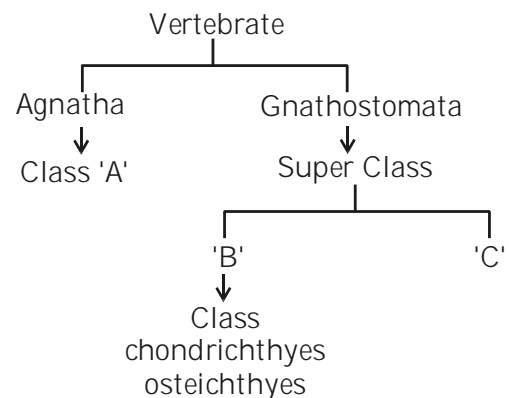
149. Nereis, an aquatic form is _____but leech is____

(1) dioecious, dioecious

(2) dioecious, monoecious

(3) monoecious, dioecious

(4) None of these.

150. Proteins produced by some strains of bacillus thuringienesis kill, How many types of following insects ?

(a) Tobacco budworm   (b) Army worm

(c) Beetles   (d) Flies

(e) Mosquitoes

(1) 3 only   (2) 4 only

(3) Only one   (4) All five.

151. Select the correct option to identify the 'A', 'B' and 'C' in given chart :–

Vertebrate

Agnatha   Gnathostomata

↓   ↓

Class 'A'   Super Class

'B'   'C'

↓

Class chondrichthyes osteichthyes

(1) A – Pisces, B – Tetrapod, C – Cyclostomata

(2) A – Cyclostomata, B – Pisces, C – Tetrapod

(3) A – Tetrapod, B – Pisces, C – Cyclostomata

(4) A – Pisces, B – Cyclostomata, C – Tetrapod

152. How many given animals have diploblastic body organisation ?

Ascaris, Hydra, Physalia, Obelia, Sea fan, Wuchereria, Planeria, Taenia solium and Pleurobrachia.

(1) 6   (2) 5

(3) 4   (4) 3

153. Which is the common character among of these animals ?

(a) Silver fish   (b) Scorpion

(c) Carb   (d) Honey bee

Correct answer is :–

(1) Compound eyes   (2) Poison gland

(3) Jointed legs   (4) Metamorphosis

154. Select the incorrect statements :–

(1) All chordates are Vertebrates but all Vertebrates are not chordates.

(2) Vertebrates possess notochord during embryonic period

(3) Notochord of vertbrates is generally replaced by bony or Cartilaginous vertebral column.

(4) The vertebrates have a Ventral muscular heart with two, three or four chambers.

155. Select incorrect pair :–
   (1) Ophiura – Brittle star
    (2) Pinctada – Pearl oyster
    (3) Meandrina – Brain coral
    (4) Spongilla – marine water sponge

156. Consider the following animals :–
    Chelone, Aptenodytes, Calotes, Carcharodon, Balaenoptera, pteropus and Crocodilus.
    How many of these have incompletely separated double circulation of blood in their body ?
    (1) Two   (2) Three
    (3) Four   (4) Five

157. Identify the following figures :–

    (A)   (B)

    (C)   (D)
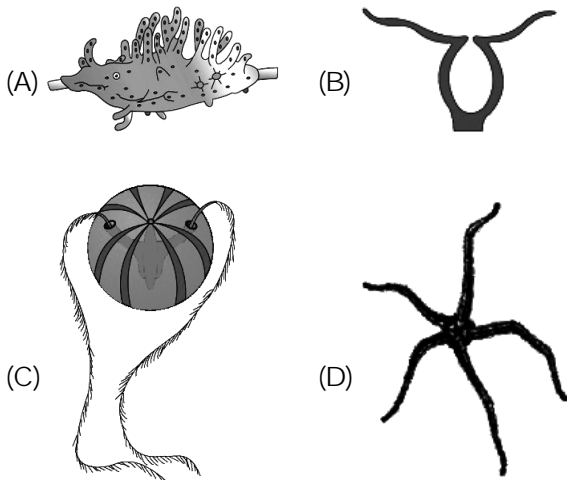
    (1) A → ophiura, B → polyp, C → Ctenophora, D → Spongilla
    (2) A → Polyp, B → Spongilla, C → Ctenophora, D → Ophiura
    (3) A → Polyp, B → Spongilla, C → Ophiura, D → Ctenophora
    (4) A → Spongilla, B → Polyp, C → Ctenophora, D → Ophiura

158. Identify the following figures and choose the correct statements :–

    (A)   (B)
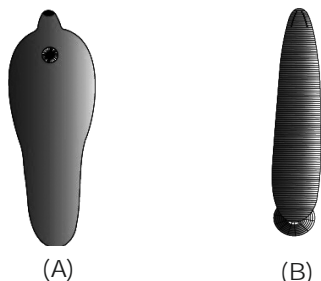
    (a) (A) – Phylum – Aschelminthes, (B) – Phylum – Platyhelminthes
    (b) (A) – Phylum – Platyhelminthes, (B) – Phylum – Annelida
    (c) (A) and (B) both are bilaterally symmetrical
    (d) (A) – Liver fluke and (B) – Hirudinaria
   (1) statements (a) and (c) are correct

    (2) statements (a), (b), (c) and (d) all are correct
    (3) statements (b), (c) and (d) are correct
    (4) only statement (a) is correct

159. Cyclostomes are ____(A)___ but migrate for spawning to ___(B)____.
    (1) (A) – Marine, (B) – Fresh water
    (2) (A) – Marine, (B) – Brackish water
    (3) (A) – Fresh water, (B) – Marine
    (4) (A) – Brackish water, (B) – Fresh water

160. Which of the following is correct for Echinodermata :
    (1) fertilization is usually external
    (2) Digestive system is incomplete
    (3) Development is direct
    (4) Organ grade of organisation

161. Adamsia is :
    (1) Triploblastic, Radial symmetry and Acoelomate
    (2) Triploblastic, Radial symmetry and coelomate
    (3) Diploblastic , Radial symmetry and Acoelomate
    (4) Diploblastic, Radial symmetry and coelomate

162. Match the column (A) and column (B) and select the answer from given codes :–

    Column – (A)   Column – (B)
    (A) Exocoetus   (i) Sea horse
    (B) Hippocampus   (ii) Angel fish
    (C) Betta   (iii) Flying fish
    (D) Pterophyllum   (iv) Fighting fish
    (1) A – (iii) B – (ii)   C – (iv)   D – (i)
    (2) A – (i)   B – (ii)   C – (iv)   D – (iii)
    (3) A – (iii) B – (i)   C – (iv)   D – (ii)
    (4) A – (iii) B – (i)   C – (ii)   D – (iv)

163. Planaria posses high power of regeneration belong to which phylum:–
    (1) Annelida   (2) Arthropoda
    (3) Aschelminthes   (4) Platyhelminthes

164. The canal system in sponges develops due to :-
    (1) Porous walls
    (2) Gastrovascular system
    (3) Reproduction
    (4) Folding of inner walls

165. Which of the following combinations is incorrect ?
    (1) Nematoda - roundworms, pseudocoelomate
    (2) Calcarea - gastrovascular cavity, coelom present
    (3) Echinodermata - coelom present, bilateral symmetry
    (4) Platyhelminthes - gastrovascular cavity, flatworms, acoelomate

166. Identify the following figure and choose the correct option

    A
    B

A	B
(1) Hydrogen bond	Disulphide bond
(2) Disulphide bond	Hydrogen bond
(3) Hydrogen bond	Ionic bond
(4) Covalent bond	Disulphide bond

167. Which of the following amino acid is not optically active ?
(1) Glycine   (2) Valine
(3) Leucine   (4) Isoleucine.

168. Protein structure which is absolutely necessary for the many biological activity of proteins is

(1) 2^0 (2) 3^0 (3) 4^0 (4) 1^0

169. Among C, H, Na, O, Mg, N, S, Ca. How many elements shows abundance in earthis crust relative to human body
(1) 5   (2) 3   (3) 4   (4) 2

170. Ricin is a 2^0 metabolite, which falls in the category of :–
(1) Alkaloids   (2) Toxins
(3) Drugs   (4) Lectins

171. Choose the type of enzyme involved in the following reaction :–
$$S – G + S' \longrightarrow S + S' – G$$
(1) Dehydrogenase   (2) Transferase
(3) Hydrolase   (4) Lyase

172. Find out the wrongly matched pair :–
(1) Primary metabolite – Ribose
(2) Secondary metabolite – Anthocyanin
(3) Protein – Insulin
(4) Cellulose – Heteropolymer

173. Identify the components labelled A, B, C and D in the given figure of cell membrane from the list (i) to (vii) given along with and select the correct option :
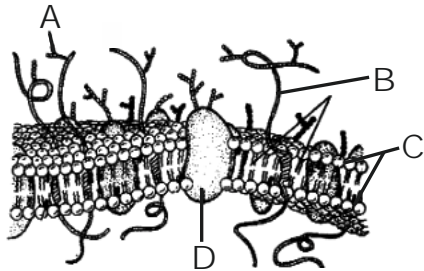

Components
(i) Sugar
(ii) Protein
(iii) Lipid bilayer
(iv) Integral Protein
(v) Cytoplasm
(vi) Cell wall
(vii) External Protein
The correct matching of components is ___
(1) A – (i) B –(ii) C – (iii) D – (iv)
(2) A – (ii) B –(i) C – (iii) D – (iv)
(3) A – (i) B –(ii) C – (iii) D – (vi)
(4) A – (i) B –(ii) C – (iii) D – (vii)

174. Stratum germinativum is an example of which kind of epithelium ?
(1) columnar   (2) squamous
(3) cuboidal   (4) ciliated

175. The figure given below shows the head region of Cockroach. Identify the structures labelled as A to F :–
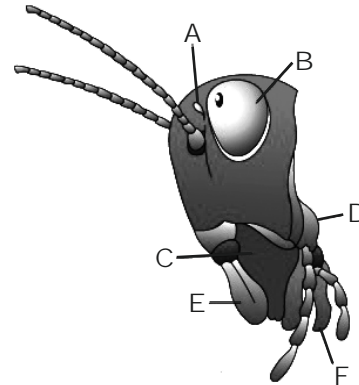
s(1)   A – Compound eye, B – Ocellus, C - Maxilla, D – Mandible, E – Labrum, F – Labium
(2) A – Ocellus, B – Compound eye, C – Mandible, D – Maxilla, E – Labrum, F – Labium
(3) A – Ocellus, B – Compound eye, C – Mandible, D – maxilla, E – Labium, F – Labrum
(4) A – Ocellus, B – Compound eye, C – maxilla, D – Mandible, E - Labrum, F – Labium

176. Tendon is made up of :–
(1) areolar tissue
(2) adipose tissue
(3) modified yellow elastic fibrous tissue
(4) modified white fibrous tissue

177. Characteristic of simple epithelium is that they :-
(1) are arranged indiscriminately
(2) continue to divide and help in organ function
(3) make a definite layer
(4) are elastic in nature.

178. Hair present in the skin are :-
(1) Epidermal in origin and made of dead cells
(2) Epidermal in origin and made of living cells
(3) Dermal in origin and made of living cells
(4) Dermal in origin and made of dead cells

179. Which of the following contains the largest quantity of extracellular material ?
(1) Areolar tissue   (2) Striated muscle
(3) Myelinated nerve fibres
(4) stratified epithelium

180. Which cells do not form layer and remains structurally seperate ?
(1) Nerve cells   (2) Gland cells
(3) Muscles cells   (4) Gland cells