1. Rydberg constant R has the dimension of L^{-1}, which of the following can represnt the dimensionally correct fourmula for R?

   (1) $\dfrac{e^2 m}{8h^2 \varepsilon_0^3 c}$

   (2) $\dfrac{e^4 m}{8h^3 \varepsilon_0 c^2}$

   (3) $\dfrac{e^3 m^2}{8h^3 \varepsilon_0^2 c}$

   (4) $\dfrac{e^4 m}{8h^3 \varepsilon_0^2 c}$

2. If a ball is thrown upwards from the surface of earth
   (1) The earth remains stationay while the ball moves upwards
   (2) The ball remains stationary while the earth moves downwards
   (3) The ball and earth both move towards each other
   (4) The ball and earth both move away from each other

3. A projectile fired at an angle of $\tan^{-1}\left(\dfrac{25}{12}\right)$ just clears a wall 16 m away from the point of projection and hit the ground 9m away from the wall on the other side. The maximum height of wall is
   (1) 5 m　　　　　　　(2) 12 m
   (3) 25 m　　　　　　(4) 9 m

4. A pushing force F, making an angle 53° with vertical, acts on a block of mass 1 kg. This block is kept on a long plank of mass 2 kg as shown. The coefficient of kinetic friction between the block and plank is 0.2 and the plank is kept on a frictionless floor. What is the value of F for which acceleration of the block is twice the acceleration of the plank ?
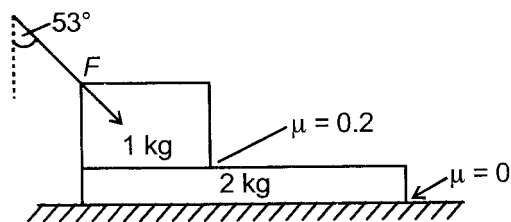
   (1) $\dfrac{100}{7}$ N

   (2) $\dfrac{50}{3}$ N

   (3) $\dfrac{50}{7}$ N

   (4) $\dfrac{100}{3}$ N

5. A bullet of mass m moving with speed u penetrates through a series of planks and finally stops in the 6th plank. Then the speed of bullet after emerging from 3rd plank can be :
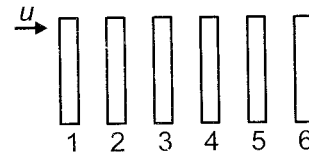
   (1) $\dfrac{u}{2}$

   (2) $\dfrac{u}{\sqrt{2}}$

   (3) 0.6 u　　　　　　(4) 0.4 u

6. A particle of mass 1 g moving with a velocity $u_1 = (3\hat{i} - 2\hat{j})\,m/s$ expriences a perfectly inelastic collision with another particle of mass 2 g and velocity $\bar{u}_2 = (4\hat{j} - 6\hat{k})\,m/s$. The velocity of the combined particle is :

   (1) $\hat{i} + 2\hat{j} - 4\hat{k}$

   (2) $\hat{i} - 2\hat{j} + 4\hat{k}$

   (3) $2\hat{i} - 2\hat{j} - 4\hat{k}$

   (4) $\hat{i} + 3.33\hat{j} - 4\hat{k}$

7. An object of mass m is moving on a circular track of radius r such that its centripetal acceleration a_c is given by $a_c = k^2 r t^2$, where k is contant. The power delivered to the particle by the force acting on it is
   (1) $mk^2 r^2 t$

   (2) Zero

   (3) $2pmk^2 r^2$

   (4) $\dfrac{mk^4 r^2 t^5}{3}$

8. A spring of spring constant k is stretched by applying a force F on it such that the energy stored in the spring is E. Now, this spring is cut in three parts in the length ratio 1 : 2 : 3. Each part of the spring is stretched by applying a force of F on it. The ratio of energy stored in each spring is :
   (1) 6 : 3 : 2　　　　(2) 2 : 3 : 6
   (3) 1 : 2 : 3　　　　(4) 3 : 2 : 1

9. There are hundred identical sliders equally spaced on a frictionless track as shown in the figure. Initially all the sliders are at rest. Slider 1 is pushed with velocity v towards slider 2. In a collision the sliders stick together. The final velocity of the set of hundred stucked sliders will be
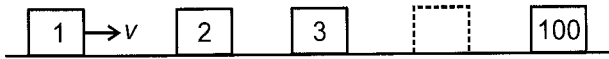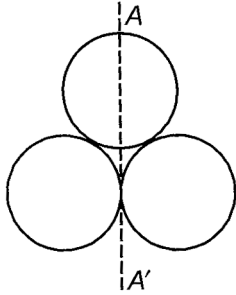
(1) $\dfrac{v}{99}$ (2) $\dfrac{v}{100}$

(3) v   (4) Zero

10. Three identical wires of length l and mass m are used to create circular rings to form a toy (The shape as shown).

If this toy is rotated about the axis AA', then the moment of inertia of the toy will be :

(1) $\dfrac{5ml^2}{2\pi^2}$ (2) $\dfrac{5ml^2}{4\pi^2}$

(3) $\dfrac{7ml^2}{4\pi^2}$ (4) $\dfrac{7ml^2}{8\pi^2}$

11. A small planet is revolving around a massive star in a nearly circular orbit of radius R with a period of revolution T. if the gravitational force of attraction between the planet and the star is proportional to $R^{-5/2}$, then

(1) $T^2 \propto R^2$ (2) $T^2 \propto R^{3/2}$

(3) $T^2 \propto R^{3/4}$ (4) $T^2 \propto R^{7/2}$

12. If the distance between the earth and the sun was half its present value, then the number of days in a year would have been :
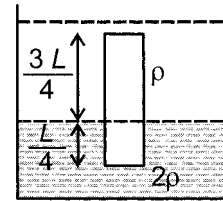(1) 64.5   (2) 129
(3) 182.5   (4) 730.

13. A solid cylinder of length L is immersed such that it floats with its axis vertical at the liquid – liquid interface as shown.

The length $\dfrac{L}{4}$ of the cylinder is inside the denser liquid (density 2ρ) and $\dfrac{3L}{4}$ part is in less denser liquid (ρ). The density of the solid cylinder (D) is

(1) $\dfrac{5}{4}\rho$ (2) $\dfrac{4}{5}\rho$

(3) 4ρ (4) $\dfrac{\rho}{5}$

14. Three capillaries, made up of same material, have their radii in the ratio 1 ; 2 : 4. The ratio of volume of liquid, which rises in them when placed in water is :
(1) 1 : 1 : 1   (2) 4 : 2 : 1
(3) 1 : 4 : 16   (4) 1 : 2 : 4

15. Three rods of identical cross sectional area are made from the same metal from the sides of an isosceles triangle ABC, right angled at B. The point A and B are maintained at T and $\sqrt{2}$ T respectively, In steady state, the temperature of the point C is T_c. Assuming that only heat conduction takes place, $\dfrac{T_c}{T}$ is

(1) $\dfrac{1}{2(\sqrt{2}-1)}$ (2) $\dfrac{3}{(\sqrt{2}+1)}$

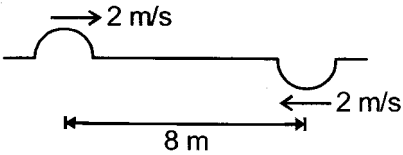(3) $\dfrac{1}{\sqrt{3}(\sqrt{2}-1)}$ (4) $\dfrac{1}{(\sqrt{2}+1)}$

16. A spherical black body of radius 12 cm radiates 450 W power at 500 K. If the radius were halved and temperature doubled, the power radiated would be
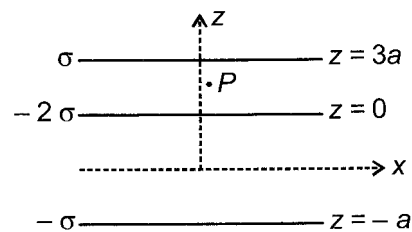(1) 225 W   (2) 450 W
(3) 900 W   (4) 1800 W

17. Starting with the same initial conditions, an ideal gas expands from volume V_1 to V_2 in three different ways, the work done by the gas is w_1 if the process is purely isothermal, w_2 if purely isobaric and w_3 if purely adiabatic, then
   (1) $w_2 > w_1 > w_3$
   (2) $w_2 > w_3 > w_1$
   (3) $w_1 > w_2 > w_3$
   (4) $w_1 > w_3 > w_2$

18. If the temperature difference between a source and a sink is twice the sink temperature and an engine is operating between the given source and sink, then the maxmimum efficiency of the engine can be
   (1) $\dfrac{3}{4}$
   (2) $\dfrac{1}{2}$
   (3) $\dfrac{2}{3}$
   (4) $\dfrac{1}{3}$

19. The ratio of the speed of sound in nitrogen gas to that in helium gas, at 300 K is :
   (1) $\sqrt{\dfrac{2}{7}}$
   (2) $\sqrt{\dfrac{1}{7}}$
   (3) $\dfrac{\sqrt{3}}{5}$
   (4) $\dfrac{\sqrt{6}}{5}$

20. An organ pipe P_1 closed at one end vibrating in its first harmonic and another pipe P_2 open at both ends vibrating in its third harmonic are in resonance with a given tuning fork. The ratio of the length of P_1 and P_2 is
   (1) $\dfrac{8}{3}$
   (2) $\dfrac{3}{8}$
   (3) $\dfrac{1}{6}$
   (4) $\dfrac{1}{3}$

21. The tension in a string obeying Hooke's law is T. The speed of transverse wave in the stretched string is v. If the tension in the string is increased by 50% the speed of transverse wave will be :
   (1) 1.50 v
   (2) 1.22 v
   (3) 0.61 v
   (4) 0.75 v

22. Two pulses in a stretched string, whose centres are initially 8 m apart are moving towards each other as shown in the figure.

   The speed of the each pulse is 2 m/s. After 2 s the total energy of the pulses will be
   (1) Zero
   (2) Purely kintic

(3) Purely potential
(4) Partly kinetic and partly potential

23. Two identical capacitors have the same capacitance C. One of them is charged to potential V_1 and the other V_2. Afer disconnecting the capacitors likely charged plates are then connected. Then, the decrease in energy of the combined system is
   (1) $\dfrac{1}{4}C\left(V_1^2 - V_2^2\right)$
   (2) $\dfrac{1}{4}C\left(V_1^2 + V_2^2\right)$
   (3) $\dfrac{1}{4}C\left(V_1 - V_2\right)^2$
   (4) $\dfrac{1}{4}C\left(V_1 + V_2\right)^2$

24. Three infinitely long charge sheets are placed as shown in figure. The electric field at point P due to upper two plate is

   (1) $\dfrac{2\sigma}{\varepsilon_0}\hat{k}$
   (2) $-\dfrac{2\sigma}{\varepsilon_0}\hat{k}$
   (3) $\dfrac{4\sigma}{\varepsilon_0}\hat{k}$
   (4) $-\dfrac{3\sigma}{2\varepsilon_0}\hat{k}$

25. In the given circuit with steady current, the potential differnece across the resistance to R capacitor must be
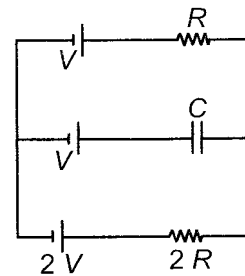
   (1) V
   (2) $\dfrac{V}{2}$
   (3) $\dfrac{V}{3}$
   (4) $\dfrac{2V}{3}$

26. A cell of EMF 8 V and internal resistance 2 Ω needs to be used to draw maximum output power using a device of resistance R. The value of resistance R is
(1) 0 Ω   (2) 1 Ω
(3) 2 Ω   (4) 4 Ω

27. Two concentric circular loops of one turn each having radii a and b (a < b) have equal current (I) flowing in them in opposite direction. The magnetic field on the common axial line at a distance x from the centre of the loops is
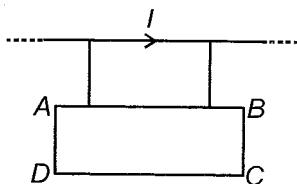
(1) $\left|\dfrac{\mu_0 I}{2}\left[\dfrac{b^2}{(x^2+b^2)^{\frac{3}{2}}}+\dfrac{a^2}{(x^2+a^2)^{\frac{3}{2}}}\right]\right|$

(2) $\left|\dfrac{\mu_0 I}{2}\left[\dfrac{b^2}{(x^2+b^2)^{\frac{3}{2}}}-\dfrac{a^2}{(x^2+a^2)^{\frac{3}{2}}}\right]\right|$

(3) $\left|\mu_0 I\left[\dfrac{b^2}{(x^2+b^2)^{\frac{3}{2}}}+\dfrac{a^2}{(x^2+a^2)^{\frac{3}{2}}}\right]\right|$

(4) $\left|\mu_0 I\left[\dfrac{b^2}{(x^2+b^2)^{\frac{3}{2}}}-\dfrac{a^2}{(x^2+a^2)^{\frac{3}{2}}}\right]\right|$

28. A rectangular loop was hanging vertically from a current carrying wire with the help of an insulated thread. Suddenly the thread is cut and the loop starts to fall vertically downward a shown.


The direction in which the current will flow in the loop will be :
(1) From A to B   (2) From A to D
(3) From C to B   (4) No current will flow in the loop

29. A proton, a deuteron and an α – particle having the same kinetic energy are moving in circular trajectories in a uniform magnetic field. If r_p, r_d and r_α denote the respective radii of the trajectories of these particles, then

(1) $r_\alpha = r_p < r_d$ (2) $r_\alpha > r_d > r_p$
(3) $r_\alpha = r_d > r_p$ (4) $r_p = r_d = r_\alpha$

30. A massive rod of length 1 m placed straight on a smooth horizontal surface is pulled longitudinally by a force F of 10 N as shown in the figure. The tension in rod varies as $T = 10\sqrt{x}$. The linear mass density of rod is :
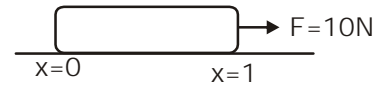
(1) $\lambda \propto x$ (2) $\lambda \propto \dfrac{1}{\sqrt{x}}$

(3) $\lambda \propto \sqrt{x}$ (4) $\lambda \propto x^2$

31. Two identical circular loops of metal wire are lying on table without touching each other. Loop A carries a current which increases with time. In response, the loop B
(1) Remains stationary
(2) Is attracted to the loop A
(3) Is repelled by the loop A
(4) Rotates about its CM, with CM fixed

32. In a series LCR circuit which is connected to an AC voltage source, choose the related correct statement.
(1) The algebraic sum of instantaneous voltage across L, C and R is constant
(2) $(V_L)_{inst} + (V_C)_{inst} + (V_R)_{inst} = (V_{source})_{inst}$
(3) Voltage acorss insductor and resistance will be same
(4) Potentiaal difference across inductaor, capacitor and resistance will be same

33. A 10% efficient 100 W bulb operating at maximum efficiency produces radiation at a distance of 1 m. The intensity of incident radiation will be
(1) 1 W/m²   (2) 0.8 W/m²
(3) 1.5 /m²   (4) 1.2 W/m²

34. If radii of curvature of both convex surfaces are 30 cm, then focal length of the lens for an object placed far away in air in the given arrangement is
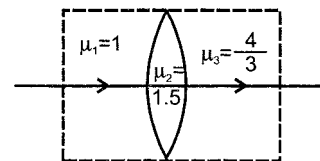
(1) 40 cm   (2) 60 cm
(3) 80 cm   (4) 100 cm

35. A short linear object of length b lies along the axis of a concave mirror of focal length f at a distance u from the pole of the mirror. The size of the image is approximetely equal to

(1) $b\left(\dfrac{u-f}{f}\right)^{1/2}$ (2) $\left(\dfrac{f}{u-f}\right)^{1/2}$

(3) $b\left(\dfrac{u-f}{f}\right)$ (4) $b\left(\dfrac{f}{u-f}\right)^{2}$

36. In light wave,
(a) electric field and magnetic field are in same phase
(b) electric field, magnetic field and progagation of wave, all are mutually perpendicular to each other
(c) light wave is electromagnetic wave
(d) the speed of light is vaccum in independent reference fram
which is correct
(1) all   (2) a, b, c
(3) a,b   (4) c, d

37. An old person is using a spectacle having bifocal lenses. The power of the two lenses L_1 and L_2 is + 2 D and – 1 D. Then, the range within which he can see clearly is
(1) 25 cm to 1 m   (2) 50 cm to 75 cm
(3) 25 cm to 75 cm   (4) 50 cm to 1 m

38. A parallel monochromatic beam of light is incident normally on a narrow slit. A diffraction pattern is formed on a screen placed perpendicular to the direction fo the incident beam. At the first minimum of the diffraction pattern, the phase difference between the rays from the two edges of the slit is

(1) 0   (2) $\dfrac{\pi}{2}$

(3) π (4) 2π

39. In Hydrogen –like atoms, ratio of $E_{4n} - E_{2n}$ and $E_{2n} - E_n$ is proportional to

(1) $\dfrac{Z^2}{n^2}$ (2) $\dfrac{Z^4}{n^4}$
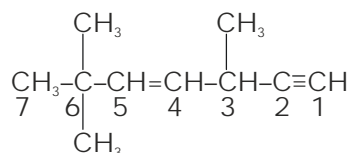
(3) $\dfrac{Z}{n}$ (4) $\dfrac{Z^0}{n^0}$

40. If the maximum kinetic energy of the photoelectron emitted is 4 eV, then the corresponding minimum de – Broglie wavelength should be
(1) 1.23×10^{-9} m   (2) 6.13×10^{-10} m
(3) 12.3×10^{-10} m   (4) 3.04×10^{-10} m

41. As per Bohr model, the minimum energy (in eV) required to remove an electron from the ground state of doubly ionized Li atom (Z = 3) is
(1) 1.51   (2) 13. 6
(3) 40. 8   (4) 122. 4

42. A radioactive particle of mass M at rest decays producing two particles of masses m_1 and m_2 having non – zero velocities. The ratio of the de – Broglie wavelengths of the particles $\dfrac{\lambda_1}{\lambda_2}$ is

(1) $\dfrac{m_1}{m_2}$ (2) $\dfrac{m_2}{m_1}$

(3) 1   (4) $\dfrac{\sqrt{m_2}}{\sqrt{m_1}}$

43. Output characteristices of an n – p– n CE transistor are pollated as shown in the figure. For the given transistor,
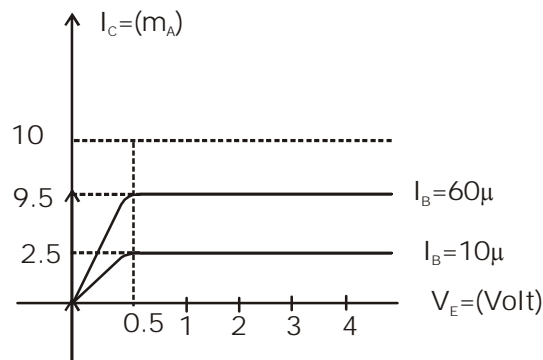
(1) current amplification is of 50
(2) current amplification is 140
(3) current amplification is 240
(4) current amplification is 340

44. In a p – n junction diode not connected to any circuit
(1) The potential is the same everywhere
(2) The p – side is at higher potential than the n – type side
(3) There is an electric field at the junction directed from n – side to the p – side
(4) There is an electric field at the junction directed from the p – side to the n – side
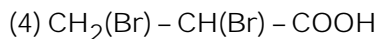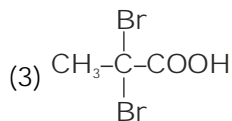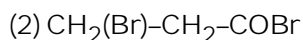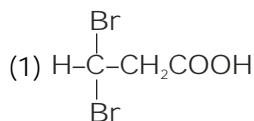
45. In $_{14}^{28}\text{Si}$ (silicon) and $_{37}^{85}\text{Rb}$ (rubidium) ratio of neutrons in their nuclic is

(1) $\dfrac{28}{85}$ (2) $\dfrac{14}{37}$

(3) $\dfrac{7}{24}$ (4) $\dfrac{17}{21}$

46. The measurement of the electron position is associated with an uncertainty in momentum, which is equal to 1×10^{-18} g cm s^{-1}. The uncertainty in electron velocity is (mass of electron is 9×10^{-28} g).

(1) 1×10^5 cm s^{-1} (2) 1×10^{11} cm s^{-1}

(3) 1×10^9 cm s^{-1} (4) 1×10^6 cm s^{-1}

47. Four diatomic species are listed below in different sequences. Which of these presents the correct order of their increasing bond order ?

(1) $C_2^{2-} < He_2^+ < NO < O_2^-$

(2) $He_2^+ < O_2^- < NO < C_2^{2-}$

(3) $O_2^- < NO < C_2^{2-} < He_2^+$

(4) $NO < C_2^{2-} < O_2^- < He_2^+$

48. If a stands for the edge length of the cubic system: simple cubic, body centred cubic and face centred cubic, then the ratio of radii of the spheres in these systems will be respectively.

(1) $\dfrac{1}{2}a : \dfrac{\sqrt{3}}{2}a : \dfrac{\sqrt{2}}{2}a$ (2) $1a : \sqrt{3}a : \sqrt{2}a$

(3) $\dfrac{1}{2}a : \dfrac{\sqrt{3}}{4}a : \dfrac{1}{2\sqrt{2}}a$ (4) $\dfrac{1}{2}a : \sqrt{3}a : \dfrac{1}{\sqrt{2}}a$

49. For the gas phase reaction,

$$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$$

which of the following conditions are correct ?

(1) $\Delta H < 0$ and $\Delta S < 0$

(2) $\Delta H > 0$ and $\Delta S < 0$

(3) $\Delta H = 0$ and $\Delta S < 0$

(4) $\Delta H > 0$ and $\Delta S > 0$

50. The values of K_{p_1} and K_{p_2} for the reactions

$$X \rightleftharpoons Y + Z \quad \text{... (i)}$$

$$A \rightleftharpoons 2B \quad \text{... (ii)}$$

are in the ratio 9 : 1. If degree of dissociation of X and A be equal, then total pressure at equilibrium (i) and (ii) are in the ratio

(1) 36 : 1 (2) 1 : 1 (3) 3 : 1 (4) 1 : 9

51. How many stereoisomers does this molecule have?

$CH_3CH = CHCH_2CHBrCH_3$

(1) 8 (2) 2 (3) 4 (4) 6

52. A strong base can abstract an α-hydrogen from

(1) Ketone (2) Alkane

(3) Alkene (4) Amine

53. A 0.0020 m aqueous solution of an ionic compound $[Co(NH_3)_5(NO_2)]$ Cl freezes at $-0.00732°C$. Number of moles of ions which 1 mol of ionic compound produces on being dissolved in water will be ($K_f = -1.86°C/m$)

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

54. The ionization constant of ammonium hydroxide is 1.77×10^{-5} at 298 K. Hydrolysis constant of ammonium chloride is

(1) 6.50×10^{-12} (2) 5.65×10^{-13}

(3) 5.65×10^{-12} (4) 5.65×10^{-10}

55. Oxidation numbers of P in PO_4^{3-}, of S in SO_4^{2-} and that of Cr in $Cr_2O_7^{2-}$ are respectively

(1) +3, +6 and +5 (2) +5, +3 and +6

(3) −3, +6 and +6 (4) +5, +6 and +6

56. The stability of + 1 oxidation state increases in the sequence

(1) Tl < In < Ga < Al (2) In < Tl < Ga < Al

(3) Ga < In < Al < Tl (4) Al < Ga < In < Tl

57. The straight chain polymer is formed by
    (1) Hydrolysis of CH_3SiCl_3 followed by condensation polymerisation
    (2) Hydrolysis of $(CH_3)_4Si$ by addition polymerisation
    (3) Hydrolysis of $(CH_3)_2SiCl_2$ followed by condensation polymerisation
    (4) Hydrolysis of $(CH_3)_3SiCl$ followed by condensation polymerisation

58. The state of hybridisation of C_2, C_3, C_5 and C_6 of the hydrocarbon

    $$\underset{7}{CH_3}-\underset{6}{\underset{|}{\overset{CH_3}{C}}}-\underset{5}{CH}=\underset{4}{CH}-\underset{3}{\overset{CH_3}{CH}}-\underset{2}{C}\equiv\underset{1}{CH}$$
    (with CH_3 below C_6)

    is in the following sequence
    (1) sp^3, sp^2, sp^2 and sp
    (2) sp, sp^2, sp^2 and sp^3
    (3) sp, sp^2, sp^3 and sp^2
    (4) sp, sp^3, sp^2 and sp^3

59. Which of the following reactions is an example of nucleophilic substitution reaction ?
    (1) $2RX + 2Na \rightarrow R-R + 2NaX$
    (2) $RX + H_2 \rightarrow RH + HX$
    (3) $RX + Mg \rightarrow RMgX$
    (4) $RX + KOH \rightarrow ROH + KX$

60. Propionic acid with Br_2/P yields a dibromo product. Its structure would be
    (1) $H-\underset{Br}{\overset{Br}{\underset{|}{\overset{|}{C}}}}-CH_2COOH$
    (2) $CH_2(Br)-CH_2-COBr$
    (3) $CH_3-\underset{Br}{\overset{Br}{\underset{|}{\overset{|}{C}}}}-COOH$
    (4) $CH_2(Br)-CH(Br)-COOH$

61. Which of the following hormones contains iodine?
    (1) Testosterone   (2) Adrenaline
    (3) Thyroxine   (4) Insulin

62. S_N2 reaction readily occurs in
    (1) $CH_3CH_2-O-CH_3$
    (2) $CH_3-\underset{CH_3}{\overset{CH_3}{\underset{|}{\overset{|}{C}}}}-O-CH_3$
    (3) $CH_2=CH-CH_2-O-CH_3$
    (4) $Ph-CH_2-O-CH_2-CH_3$

63. In which one of the following species the central atom has type of hybridization which is not the same as that present in the other three ?
    (1) SF_4 (2) I_3^- (3) $SbCl_5^{2-}$ (4) PCl_5

64. AB crystallizes in a body centred cubic lattice with edge length 'a' equal to 387 pm. The distance between oppositely charged ions in the lattice is
    (1) 335 pm   (2) 250 pm
    (3) 200 pm   (4) 300 pm

65. Standard entropies of X_2, Y_2 and XY_3 are 60, 40 and 50J K^{-1} mol^{-1} respectively. For the reaction $1/2X_2 + 3/2Y_2 \rightleftharpoons XY_3$, $\Delta H = -30kJ$, to be at equilibrium, the temperature should be
    (1) 750 K   (2) 1000 K   (3) 1250 K   (4) 500 K

66. In which of the following equilibrium K_c and K_p are not equal ?
    (1) $2NO_{(g)} \rightleftharpoons N_{2(g)} + O_{2(g)}$
    (2) $SO_{2(g)} + NO_{2(g)} \rightleftharpoons SO_{3(g)} + NO_{(g)}$
    (3) $H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
    (4) $2C_{(s)} + O_{2(g)} \rightleftharpoons 2CO_{2(g)}$

67. For the reduction of silver ions with copper metal, the standard cell potential was found to be +0.46 V at 25°C. The value of standard Gibb's energy, $\Delta G°$ will be (F = 96500 C mol^{-1})'
    (1) –89.0 kJ   (2) –89.0 J
   (3) –44.5 kJ   (4) –98.0 kJ

68. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl?

    (1) Cl < F < O < S
    (2) O < S < F < Cl
    (3) F < S < O < Cl
    (4) S < O < Cl < F

69. The existance of two different coloured complexes with the composition of $[Co(NH_3)_4Cl_2]^+$ is due to

    (1) Linkage isomerism
    (2) Geometrical isomerism
    (3) Coordination isomerism
    (4) Ionization isomerism

70. In a set of reactions, ethylbenzene yielded a product D.

    D would be

    (1)

    (2)

    (3)

    (4)
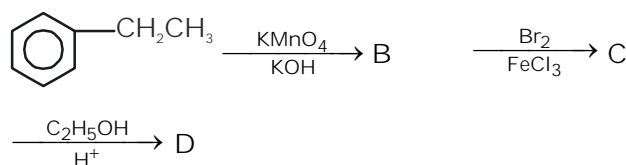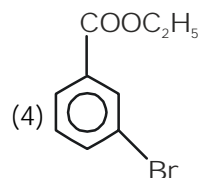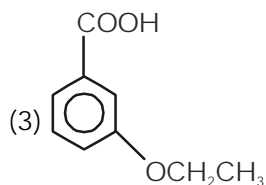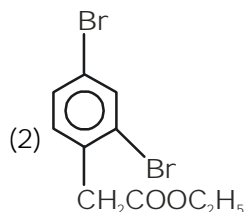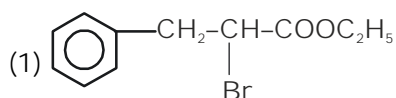
71. Given are cyclohexanol (I), acetic acid (II), 2, 4, 6-trinitrophenol (III) and phenol (IV). In these the order of decreasing acidic character will be

    (1) III > II > IV > I
    (2) II > III > I > IV
    (3) II > III > IV > I
    (4) III > IV > II > I

72. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is

    (1) CH_3COOCH_3
    (2) CH_3CONH_2
    (3) $CH_3COOCOCH_3$
    (4) CH_3COCl

73. Which of the following statements about primary amines is false ?

    (1) Alkyl amines are stronger bases than aryl amines
    (2) Alkyl amines react with nitrous acid to produce alcohols
    (3) Aryl amines react with nitrous acid to produce phenols
    (4) Alkyl amines are stronger bases than ammonia

74. Which of the following structures represents neoprene polymer?

    (1) $-(CH_2-C=CH-CH_2)_n-$ with Cl on C
    (2) $-(CH_2-CH)_n-$ with CN
    (3) $-(CH_2-CH)_n-$ with Cl
    (4) $-(CH-CH_2)_n-$ with C_6H_5
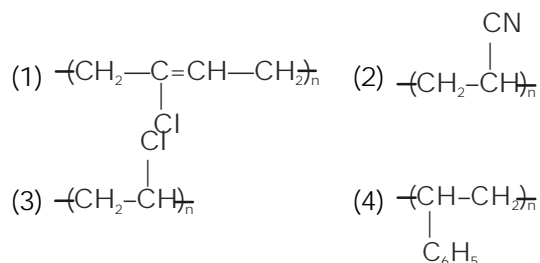
75. The pressure exerted by 6.0g of methane gas in a 0.03 m³ vessel at 129°C is (Atomic masses : C = 12.01, H = 1.01 and R = 8.314 J K⁻¹ mol⁻¹)

    (1) 215216 Pa
    (2) 13409 Pa
    (3) 41648 Pa
    (4) 31684 Pa

76. The following two reactions are known

$$Fe_2O_{3(s)} + 3CO_{(g)} \longrightarrow 2Fe_{(s)} + 3CO_{2(g)}$$
$$\Delta H = -26.8 \text{ kJ}$$

$$FeO_{(s)} + CO_{(g)} \longrightarrow Fe_{(s)} + CO_{2(g)}$$
$$\Delta H = -16.5 \text{ kJ}$$
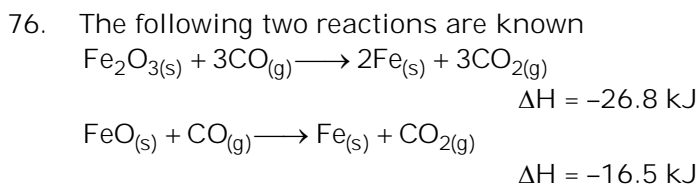
The value of ΔH for the following reaction

$$Fe_2O_{3(s)} + CO_{(g)} \longrightarrow 2FeO_{(s)} + CO_{2(g)} \text{ is}$$

(1) +10.3 kJ (2) −43.3 kJ
(3) −10.3 kJ (4) +6.2 kJ

77. Which of the following expressions correctly represents the equivalent conductance at infinite dilution of $Al_2(SO_4)_3$. Given that $\mathring{\Lambda}_{Al^{3+}}$ and $\mathring{\Lambda}_{SO_4^{2-}}$ are the equivalent conductances at infinite dilution of the respective ions?

(1) $2\mathring{\Lambda}_{Al^{3+}} + 3\mathring{\Lambda}_{SO_4^{2-}}$ (2) $\mathring{\Lambda}_{Al^{3+}} + \mathring{\Lambda}_{SO_4^{2-}}$

(3) $(\mathring{\Lambda}_{Al^{3+}} + \mathring{\Lambda}_{SO_4^{2-}}) \times 6$ (4) $\frac{1}{3}\mathring{\Lambda}_{Al^{3+}} + \frac{1}{2}\mathring{\Lambda}_{SO_4^{2-}}$

78. Some statements about heavy water are given below :
(i) Heavy water is used as a moderator in nuclear reactors
(ii) Heavy water is more associated than ordinary water
(iii) Heavy water is more effective solvent than ordinary water
Which of the above statements are correct?
(1) (i) and (ii) (2) (i), (ii) and (iii)
(3) (ii) and (iii) (4) (i) and (iii)

79. Which of the following statements is not true for halogen ?
(1) All but flurine show positive oxidation states
(2) All are oxidising agents
(3) All form monobasic oxyacids
(4) Chlorine has the highest electron-gain enthalpy

80. Which one of the following complexes is not expected to exhibit isomerism?

(1) $[Ni(NH_3)_4(H_2O)_2]^{2+}$ (2) $[Pt(NH_3)_2Cl_2]$

(3) $[Ni(NH_3)_2Cl_2]$ (4) $[Ni(en)_3]^{2+}$

81. Bleaching powder does not contain

(1) $CaCl_2$ (2) $Ca(OH)_2$

(3) $Ca(OCl)_2$ (4) $Ca(ClO_3)_2$

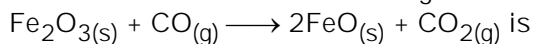82. For a reaction $X \longrightarrow Y$, the graph of the product concentration (x) versus time (t) came out to be a straight line passing through the origin. Hence the graph of $\frac{-d[X]}{dt}$ and time would be

(1) straight line with a negative slope and an intercept on y-axis
(2) straight line with a positive slope and an intercept on y-axis
(3) a straight line parallel to x-axis
(4) a hyperbola

83. A catalyst
(1) changes the equilibrium constant
(2) lowers the activation energy
(3) increases the forward and backward reactions at different speeds
(4) follows same mechanism for the reacction

84. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on further treatment with aqueous KOH yields compound F. Compound F is
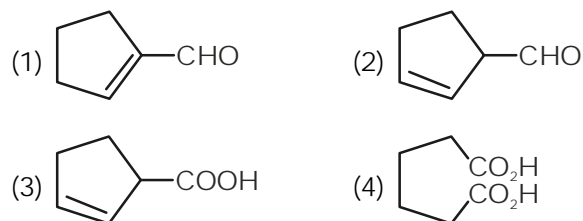
85. The strained tetracyclic alkane is isomerized thermally to the cyclic alkene. The reaction involves
(1) freely radical (2) carbocation
(3) carbanion (4) carbene

86. 25 mL, 0.2 M $Ca(OH)_2$ is neutralised by 10 mL of 1 M HCl. Then pH of resulting solution is
(1) 1.37 (2) 9 (3) 12 (4) 7

87. Which of the following is not hygroscopic?
(1) CsCl (2) $MgCl_2$ (3) $CaCl_2$ (4) LiCl

88. Decreasing order of nucleophilicity is

(1) $OH^- > NH_2^- > CH_3O^- > RNH_2$
(2) $NH_2^- > OH^- > CH_3O^- > RNH_2$
(3) $NH_2^- > CH_3O^- > OH^- > RNH_2$
(4) $CH_3O^- > NH_2^- > OH^- > RNH_2$

89. The number of σ- and π- bonds present in pent-4-ene 1-yne is
    (1) 10, 3   (2) 4, 9   (3) 3, 10   (4) 9, 4

90. Find the hydrolysis product when a phosphodiester bond of nucleotide breaks
    (1) $3 - OH - deoxyribose - 5 - PO_4^{3-}$
    (2) $5 - OH - deoxyribose - 3 - PO_4^{3-}$
    (3) $2 - OH - deoxyribose - 2 - PO_4^{3-}$
    (4) $4 - OH - deoxyribose - 2 - PO_4^{3-}$

91. Embryo with more than 16 blastomeres formed due to in vitro fertilisation is transferred into
    (1) uterus   (2) Fallopian tube
    (3) fimbriae   (4) cervix

92. Which of the following depicts the correct pathway of transport of sperms ?
    (1) Rete testis $\rightarrow$ Efferent ductules $\rightarrow$ Epididymis $\rightarrow$ Vas deferens
    (2) Rete testis $\rightarrow$ Epididymis $\rightarrow$ Efferent ductules $\rightarrow$ Vas deferens
    (3) Rete testis $\rightarrow$ Vas deferens $\rightarrow$ Efferent $\rightarrow$ ductules $\rightarrow$ Epididymis
    (4) Efferent ductules $\rightarrow$ Rete testis $\rightarrow$ Vas deference $\rightarrow$ Epididymis

93. Match column I with column II and select the correct option using the codes given below.
    Column – I   Column – II
    A. Mons pubis   (i) Embryo formation
    B. Antrum   (ii) Sperm
    C. Trophectoderm   (iii) Female external genitalia
    D. Nebenkern   (iv) Graafian follicle

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

94. Several hormones like hCG, hPL, estrogen, progesterone are produced by
    (1) ovary   (2) placenta
    (3) Fallopian tube   (4) pituitary

95. If a colour – blind man marries a woman who is homozygous for normal colour vision, the probability of their son being colour – blind is
    (1) 0   (2) 0.5
    (3) 0.75   (4) 1

96. The chronological order of human evolution from early to the recent is
    (1) Australopithecus $\rightarrow$ Ramapithecus $\rightarrow$ Homo habilis $\rightarrow$ Homo erectus
    (2) Ramapithecus $\rightarrow$ Australopithecus $\rightarrow$ Homo habilis $\rightarrow$ Homo erectus
    (3) Ramapithecus $\rightarrow$ Homo habilis $\rightarrow$ Australopithecus $\rightarrow$ Homo erectus
    (4) Australopithecus $\rightarrow$ Homo habilis $\rightarrow$ Ramapithecus $\rightarrow$ Homo erectus

97. Which of the following is the correct sequnce of events in the origin of life ?
    I. Formation of protobionts
    II. Synthesis of organic monomers
    III. Synthesis of organic polymers
    IV. Formation of DNA – based genetic systems
    (1) I, II, III, IV   (2) I, III, II, IV
    (3) II, III, I, IV   (4) II, III, IV, I

98. A molecule that can act as a genetic material must fulfill the traits given below, except
    (1) it should be able to express itself in the form of 'Mendelian characters'
    (2) it should be able to generate its replica
    (3) it should be unstable structurally and chemically
    (4) it should provide the scope for slow changes that are required for evolution.

99. DNA – dependent RNA polymerase catalyses transcription on one strand of the DNA which is called the
    (1) template strand   (2) coding strand
    (3) alpha strand   (4) antistrand

100. Which of the following is correct regarding AIDS causative agent HIV ?
    (1) HIV is enveloped virus containing one molecule of single – stranded RNA and one molecule of reverse transcriptase
    (2) HIV is enveloped virus that contains two indentical molecules of single – stranded RNA and two molecules of reverse transcriptase
    (3) HIV is unenveloped retrovirus
    (4) Both (1) and (3)

101. Among the following edible fishes, which one is a marine fish having rich source of omega – 3 fatty acids ?
    (1) Mystus   (2) Mangur
    (3) Mrigala   (4) Mackerel

102. Match coloumn I with column – II and select the correct option using the codes given below.
    Column –I   Column – II
    A. Citric acid   (i) Trichoderma
    B. Cyclosporin A   (ii) Clostridium
    C. Statins   (iii) Aspergillus
    D. Butyric acid   (iv) Monascus
    (1) A – (iii), B –(i), C –(ii), D – (iv)
    (2) A – (iii), B –(i), C –(iv), D – (ii)
    (3) A – (i), B –(iv), C –(ii), D – (iii)
    (4) A – (iii), B –(iv), C –(i), D – (ii)

103. Biochemical Oxygen Demand (BOD) may not be a good index for pollution for water bodies receiving effluents from
    (1) domestic sewage   (2) dairy industry
    (3) petroleum industry   (4) sugar industry

104. The principle of competitive exclusion was stated by
     (1) C. Darwin
     (2) G.F. Gause
     (3) Mac Arthur
     (4) Verhulst and Pearl.

105. Which of the following National Parks is home to the famous musk deer or hangul ?
     (1) Keibul Lamjao National Park, Manipur
     (2) Bandhavgarh National Park, Madhya Pradesh
     (3) Eaglenest Wildlife Sanctuary, Arunchal Pradesh
     (4) Dachigam National Park, Jammu and Kashmir

106. The highest DDT concentration in aquatic food chain shall occur in
     (1) phytoplankton
     (2) seagull
     (3) crab
     (4) eel.

107. Which statement is wrong for Kreb's cycle ?
     (1) There is one point in the cycle where FAD^+ is reduced to $FADH_2$.
     (2) During conversion of succinyl CoA to succinic acid, a molecule of GTP is synthesised
     (3) The cycle starts with condensation of acetyl group (acetyl CoA) with pyruvic acid to yield citric acid.
     (4) There are three points in the cycle where NAD^+ is reduced to $NaDH + H^+$.

108. Phosphoenol pyruvate (PEP) is the primary CO_2 acceptor in
     (1) C_4 plants
     (2) C_2 plants
     (3) C_3 and C_4 plants
     (4) C_3 plants

109. During DNA replication, Okazaki fragments are used to elongate
     (1) the lagging strand towards replication fork
     (2) the leading strand away from replication fork
     (3) the lagging strand away from the replication fork
     (4) the leading strand towards replication fork

110. Which of the following RNAs should be most abundant in animal cell ?
     (1) tRNA
     (2) mRNA
     (3) miRNA
     (4) rRNA

111. GnRH, a hypothalamic hormone, needed in reproduction, acts on
     (1) anterior pituitary gland and stimulates secretion of LH and FSH
     (2) posterior pituitary gland and stimulates secretion of oxytocin and FSH
     (3) posterior pituitary gland and stimulates secretion of LH and relaxin
     (4) anterior pituitary gland and stimulates secretion of LH and oxytocin

112. What is the criterion for DNA fragments movement on agarose gel during gel electrophoresis ?
     (1) The smaller the fragment size, the farther it moves
     (2) Positively charged fragments move to farther end
     (3) Negatively charged fragments do not move
     (4) The larger the fragment size, the farther it moves.

113. Hypersecretion of growth hormone in adults does not cause further increase in height, because
     (1) epiphyseal plates close after adolescence
     (2) bones loose their sensitivity to growth hormone in adults
     (3) muscle fibres do not grow in size after birth
     (4) growth hormone becomes inactive in adults

114. DNA replication in bacteria occurs
     (1) within nucleolus
     (2) prior to fission
     (3) just before transcription
     (4) during S phase

115. Which one from those given below is the period for Mendel's hybridisation experiments ?
     (1) 1840 – 1850
     (2) 1857 – 1869
     (3) 1870 – 1877
     (4) 1856 – 1863

116. MALT constitutes about _____ present of the lymphoid tissue in human body.
     (1) 20%
     (2) 70%
     (3) 10%
     (4) 50%

117. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen ?
     (1) Pseudomonas
     (2) Mycoplasma
     (3) Nostoc
     (4) Bacillus

118. Which of the following represents order of 'Horse' ?
     (1) Perissodactyla
     (2) Caballus
     (3) Ferus
     (4) Equidae

119. Frog's heart when taken out of the body continues to beat for sometime.
     Select the best option from the following statements.
     (I) Frog is poikilotherm
     (II) Frog does not have any coronary circulation
     (III) Heart is "myogenic" in nature
     (IV) Heart is autoexcitable.
     (1) Only (IV)
     (2) (I) and (II)
     (3) (III) and (IV)
     (4) Only (III)

120. Homozygous purelines in cattle can be obtained by
     (1) mating of unrelated individuals of same breed
     (2) mating of individuals of different breed
     (3) mating of individuals of different species
     (4) mating of related individulas of same breed.

121. Identify the wrong statement in context of heartwood.
     (1) It is highly durable
     (2) It conducts water and minerals efficiently
     (3) It comprises dead elements with highly lignified walls
     (4) Organic compounds are deposited in it.

122. Anaphase Promoting Complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cell. If APC is defective in a human cell, which of the following is expected to occur ?
    (1) Chromosomes will be fragmented
    (2) Chromosomes will not segregate
    (3) Recombination of chromosome arms will occur
    (4) Chromosomes will not condense

123. Mycorrhizae are the example of
    (1) amensalism
    (2) antibiosis
    (3) mutualism
    (4) fungistasis

124. Out of 'X' pairs of ribs in humans only 'Y' pairs are true ribs. Select the option that correctly represents values of X and Y and provides their explanation.
    (1) X = 12, Y = 5   True ribs are attached dorsally to vertebral column and sternum on the two ends
    (2) X = 24, Y = 2   The true ribs are dorsally attached to vertebral column but are free on ventral side
    (3) X = 24, Y = 12   True ribs are dorsally attached to vertebral column but are free on ventral side
    (4) X = 12, Y = 7   True ribs are attached dorsally to vertebral column and ventrally to the sternum

125. In case of poriferans, the spongocoel is lined with flagellated cells called
    (1) oscula
    (2) choanocytes
    (3) mesenchymal cells
    (4) ostia

126. Which one of the following statements is not valid for aerosols ?
    (1) They alter rainfall and monsoon patterns
    (2) They cause incrased agricultural productivity
    (3) They have negative impact on agricultural land
    (4) They are harmful to human health

127. A baby boy aged two years is admitted to play school and passes through a dental chek – up. The dentist observed that the boy had twenty teeth. Which teeth were absent?
    (1) Canines
    (2) Pre – molars
    (3) Molars
    (4) Incisors

128. Select the mismatch
    (1) Cycas – Dioecious
    (2) Salvinia – Heterosporous
    (3) Equisetum – Homosporous
    (4) Pinus – Dioecious

129. Spliceosomes are not found in cells of
    (1) fungi
    (2) animals
    (3) bacteria
    (4) plants

130. The association of histone H_1 with a nucleosome indicates that
    (1) DNA replication is occuring
    (2) the DNA is condensed into a chromatin fibre
    (3) the DNA double helix is exposed
    (4) transcription is occuring

131. The region of biosphere reserve which is legally protected and where no human activity is allowed is known as
    (1) buffer zone
    (2) transition zone
    (3) restoration zone
    (4) core zone.

132. Select the correct statement
    (1) Franklin Stahl coined the term "linkage".
    (2) Punnett square was developed by a British scientist
    (3) Spliceosomes take part in translation
    (4) Transduction was discovered by S. Altman

133. Offsets are produced by
    (1) meiotic divisions
    (2) mitotic divisions
    (3) parthenocarpy
    (4) parthenogenesis

134. Which of the following pairs is wrongly matched ?
    (1) Starch synthesis in pea : Multiple alleles
    (2) ABO blood grouping : Co – dominance
    (3) XO type sex determination : Grasshopper
    (4) T.H. Morgan : Linkage

135. Select the correct match.
    (1) Alec Jeffreys – Streptococcus pneumoniae
    (2) Alfred Hershey and – TMV Martha Chase
    (3) Matthew Meselson – Pisum sativum and F. Stahl
    (4) Francois Jacob and – Lac operon Jacques Monod

136. Stomatal movement is not affected by
    (1) temperature
    (2) light
    (3) O_2 concentration
    (4) CO_2 concentration

137. The stage during which separation of the paired homologous chromosomes begins is
    (1) pachytene
    (2) diplotene
    (3) diakinesis
    (4) zygotene

138. The two functional groups characteristic of sugars are
    (1) hydroxyl and methyl
    (2) carbonyl and methyl
    (3) carbonyl and phosphate
    (4) carbonyl and hydroxyl

139. Which of the following is not a product of light reaction of photosysnthesis ?
    (1) ATP
    (2) NADH
    (3) NADPH
    (4) Oxygen

140. Which of the following is true for mucleolus ?
    (1) Larger nucleoli are present in dividing cells
    (2) It is a membrane – bound structure
    (3) It takes part in spindle formation
    (4) It is a site for active ribosomal RNA synthesis

141. The Golgi complex participates in
    (1) fatty acid breakdown
    (2) formation of secretory vesicles
    (3) respiration in bacteria
    (4) activation of amino acid

142. In stratosphere, which of the following elements acts as a catalyst in degradation of ozone and release of molecular oxygen ?
    (1) Carbon
    (2) Cl
    (3) Fe
    (4) Oxygen

143. Which of the following is a secondary pollutant ?
    (1) CO
    (2) CO_2
    (3) SO_2
    (4) O_3

144. Niche is
    (1) all the biological factors in the organism's enviroment
    (2) the physical space where an organism lives
    (3) the range of temperature that the organism needs to live
    (4) the functional role played by the organism where it lives .

145. What type of ecological pyramid would be obtained with the following data ?
    Secondary consumer : 120 g
    Primary consumer : 60 g
    Primary producer : 10 g
    (1) Inverted pyramid of biomass
    (2) Pyramid of energy
    (3) Upright pyramid of numbers
    (4) Upright pyramid of biomass

146. World Ozone Day is celebrated on
    (1) 5th June
    (2) 21st April
    (3) 16th September
    (4) 22nd April.

147. Which of the following is commonly used as a vector for introducing a DNA fragment in human lymphocytes ?
    (1) Retrovirus
    (2) Ti plasmid
    (3) λ – phage
    (4) pBR322

148. A 'new' variety of rice was patented by foreign company, though such varieties have been present in India for a long time. This is related to :
    (1) Co – 667
    (2) Sharbati Sonora
    (3) Lerna Rojo
    (4) Basmati

149. Select the correct match.
    (1) Ribozyme – Nucleic acid
    (2) F_2 × Recessive parent – Dihybrid cross
    (3) T.H Morgan – Transduction
    (4) G. Mendel – Transformation

150. Use of bioresources by multinational companies and orgnisations without authorisation from the concerned country and its people is called
    (1) bio-infringement
    (2) biopiracy
    (3) biodegradation
    (4) bioexploitation

151. The correct order of steps in Polymerase Chain Reaction (PCR) is
    (1) extension, denaturation, annealing
    (2) annealing, extension, denaturation
    (3) denaturation, extension, annealing
    (4) denaturation, annealing,extension.

152. Secondary xylem and phloem in dicot stem are produced by
    (1) apical meristems
    (2) vascular cambium
    (3) phellogen
    (4) axillary meristems

153. Sweet potato is a modified
    (1) stem
    (2) adventitious root
    (3) taproot
    (4) rhizome

154. Which of the following statements is correct ?
    (1) Ovules are not enclosed by ovary wall in gymnosperms
    (2) Selaginella is heterosporous, while Salvinia is homosporous
    (3) Horestails are gymnosperms
    (4) Stems are usually unbranched in both Cycas and Cedrus

155. Select the wrong statement
    (1) Cell wall is present in members of fungi and plantae
    (2) Mushrooms belongs to basidiomycetes
    (3) Pseudopodia are locomotory and feeding structures in sporozoans
    (4) Mitochondria are the powerhouse of the cell in all kingdoms except monera

156. Plants having little or no secondary growth are
    (1) grasses
    (2) deciduous angiosperms
    (3) conifers
    (4) cycads

157. Which one is wrongly matched ?
    (1) Uniflagellate gemetes – Polysiphonia
    (2) Biflagellate zoospores – Brown algae
    (3) Gemma cups – Marchantia
    (4) Unicellular organism – Chlorella

158. Match the items given in column – I with those in column II and select the correct option given below.

Column – I	Column – II
A. Herbarium	(i) It is a place having a collection of preserved plants and animals.
B. Key	(ii) A list that enumerates methodically all the species found in an area with brief description aiding identification.

C. Museum   (iii) Is a place where dried and pressed plant specimens mounted on sheets are kept.

D. Catalogue   (iv) A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

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

159. Winged pollen grains are present in
 (1) mustard   (2) Cycas
 (3) mango   (4) Pinus

160. After karyogamy followed by meiosis, spores are produced exogenously in
 (1) Neurospora   (2) Alternaria
 (3) Agaricus   (4) Saccharomyces

161. What is the role of NAD^+ in cellular respiration ?
 (1) It function as an enzyme
 (2) It function as an electron carrier
 (3) It is a nucleotide source for ATP synthesis
 (4) Both (2) and (3)

162. Pinus seed cannot germinate and establish without fungal association. This is because:
 (1) its embryo is immature
 (2) it has obligate association with mycorrhizae.
 (3) it has very hard seed coat
 (4) its seeds contain inhibitors that prevent germination

163. In Antirrhinum (Snapdragon), a red flower was crossed with a white flower and in F_1 generation, pink flowers were selfed, the F_2 generation showed white, red and pink flowers. Choose the incorrect statement from the following :
 (1) This experiment does not follow the principle of dominance
 (2) Pink colour in F_1 is due to incomplete dominance
 (3) Ratio of F_2 is $\frac{1}{4}$ (Red) : $\frac{2}{4}$ (Pink) : $\frac{1}{4}$ (White)
 (4) Law of segregation does not apply in this experiment

164. Which of the following sexually transmitted diseases is not completely curable ?
 (1) Gonorrhoea   (2) Genital warts
 (3) Genital herpes   (4) Chlamydiasis

165. Respiratory Quotient (RQ) value of tripalmitin is :
 (1) 0.9   (2) 0.7
 (3) 0.07   (4) 0.09

166. Select the correct group of biocontrol agents.
 (1) Bacillus thuringiensis, Tobacco mosaic virus, Aphids
 (2) Trichoderma, Baculovirus, Bacillus thuringiensis
 (3) Oscillatoria, Rhizobium, Trichoderma
 (4) Nostoc, Azospirillium, Nucleopolyhedrovirus

167. Concanavalin A is :
 (1) an alkaloid   (2) an essential oil
 (3) a lectin   (4) a pigment

168. Match the following organisms with the products they produce :
 (a) Lactobacillus   (i) Cheese
 (b) Saccharomyces cerevisiae   (ii) Curd
 (c) Aspergillus niger   (iii) Citric acid
 (d) Acetobacter aceti   (iv) Bread
    (v) Acetic acid
 Select the correct option

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

169. Consider the following statements :
 (A) Coenzyme or metal ion that is tightly bound to enzyme protein is called prosthetic group.
 (B) A complete catalytic active enzyme with its bound prosthetic group is called apoenzyme.
 Select the correct option.
 (1) Both (A) and (B) are true
 (2) (A) is true but (B) is false
 (3) Both (A) and (B) are false
 (4) (A) is false but (B) is true

170. Thiobacillus is a group of bacteria helpful in carrying out :
 (1) Nitrogen fixation
 (2) Chemoautotrophic fixation
 (3) Nitrification
 (4) Denitrification

171. Select the incorrect statement.
 (1) Inbreeding increases homozygosity
 (2) Inbreeding is essential to evolve purelines in any animal
 (3) Inbreeding selects harmful recessive genes that reduce fertility and productivity
 (4) Inbreeding helps in accumulation of superior genes and elimination of undesirable genes.

172. Which one of the following is not a method of in situ conservation of biodiversity ?
 (1) Biosphere Reserve
 (2) Wildlife Sanctuary
 (3) Botanical Garden
 (4) Sacred Grove

173. Placentation, in which ovules develop on the inner wall of the ovary or in peripheral part, is :
 (1) Basal   (2) Axile
 (3) Parietal   (4) Free central

174. Which of the following statements is correct ?
(1) Cornea is an external, transparent and protective proteinacious covering of the eye ball.
(2) Cornea consists of dense connective tissue of elastin and can repair itself
(3) Cornea is convex, transparent layer which is highly vascularised
(4) Cornea consists of dense matrix of collagen and is the most sensitive portion of the eye.

175. Purines found both in DNA and RNA are :
(1) Adenine and thymine
(2) Adenine and guanine
(3) Guanine and cytosine
(4) Cytosine and thymine

176. Expressed Sequence Tags (ESTs) refers to :
(1) Genes expressed as RNA
(2) Polypeptide expression
(3) DNA polymorphism
(4) Novel DNA sequences

177. What is the genetic disorder in which an individual has an overall masculine development gynaecomastia, and is sterile ?
(1) Turner's syndrome
(2) Klinefelter's syndrome
(3) Edward syndrome
(4) Down's syndrome

178. Consider following features :
(a) Organ system level of organisation
(b) Bilateral symmetry
(c) True coelomates with segmentation of body
Select the correct option of animal groups which posses all the above characteristics
(1) Annelida, Athropoda and Chordata
(2) Annelida, Arthropoda and Mollusca
(3) Arthropoda, Mollusca and Chordata
(4) Annelida, Mollusca and Chordata

179. Under which of the following conditions will there be no change in the reading frame of following mRNA ?
5′ AACAGCGGUGCUAUU 3′
(1) Insertion of G at 5th position
(2) Deletion of G from 5th position
(3) Insertion of A and G at 4th and 5th positions respectively
(4) Deletion of GGU from 7th,8th and 9th positions

180. Select the correct option :
(1) 8th,9th and 10th pairs of ribs articulate directly with the sternum
(2) 11th and 12th pairs of ribs are connected to the sternum with the help of hyaline cartilage
(3) Each rib is a flat thin bone and all the ribs are connected dorsally to the thoracic vertebrae and ventrally to the sternum
(4) There are seven pairs of vertebrosternal, three pairs of vertebrochondral and two pairs of vertebral ribs.