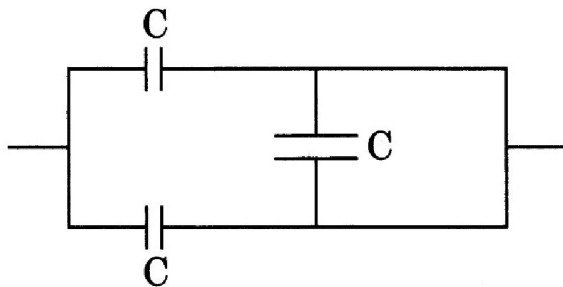## NEET EXAMINATION – 2021

VERSION : M6

DATE :- 12-09-2021   **TIME : 02.00 PM TO 05.00 PM**

PHYSICS - SECTION - A

1. The equivalent capacitance of the combination shown in the figure is:

1) 3C   2) 2C   3) C/2   4) 3C/2

Ans. 2

Sol. $C_P = C + C = 2C$

2. Polar molecules are the molecules:
   1) having zero dipole moment.
   2) acquire a dipole moment only in the presence of electric field due to displacement of charges.
   3) acquire a dipole moment only when magnetic field is absent.
   4) having a permanent electric dipole moment.

Ans. 4

Sol. Conceptual

3. An infinitely long straight conductor carries a current of 5 A as shown. An electron is moving with a speed of 10^5 m/s parallel to the conductor. The perpendicular distance between the electron and the conductor is 20 cm at an instant. Calculate the magnitude of the force experienced by the electron at that instant.
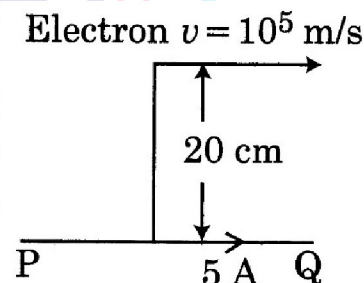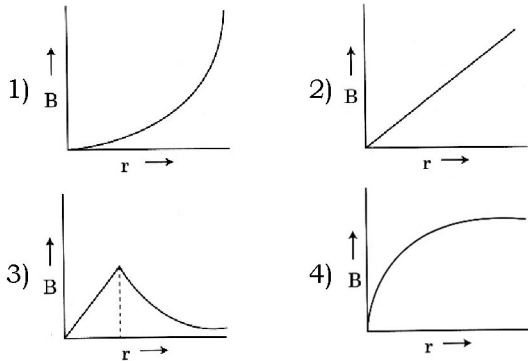

1) 4×10^{-20} N   2) $8\pi \times 10^{-20}$ N

3) $4\pi \times 10^{-20}$ N   4) 8×10^{-20} N

Ans. 4

Sol. $F = BeV$

$$= \frac{\mu_0 i}{2\pi r} ev$$

4. A thick current carrying cable of radius 'R' carries current 'I' uniformly distributed across its cross-section. The variation of magnetic field B(r) due to the cable with the distance 'r' from the axis of the cable is represented by:

1)

2)

3)

4)

Ans. 3

Sol. $r < R \quad B \propto r$

$r > R, \ B \propto \dfrac{1}{r}$

5. In a potentiometer circuit a cell of EMF 1.5 V gives balance point at 36 cm length of wire. If another cell of EMF 2.5 V replaces the first cell, then at what length of the wire, the balance point occurs?

1) 60 cm   2) 21.6 cm

3) 64 cm   4) 62 cm

Ans. 1

**Sol.** $\dfrac{E_1}{E_2} = \dfrac{\ell_1}{\ell_2}$

6. For a plane electromagnetic wave propagating in x-direction, which one of the following combination gives the correct possible directions for electric field (E) and magnetic field (B) respectively?

1) $\hat{j} + \hat{k}, \hat{j} + \hat{k}$ 2) $-\hat{j} + \hat{k}, -\hat{j} - \hat{k}$

3) $\hat{j} + \hat{k}, -\hat{j} - \hat{k}$ 4) $-\hat{j} + \hat{k}, -\hat{j} + \hat{k}$

Ans. 2

Sol. $\vec{V} = \vec{E} \times \vec{B}$ & $\vec{E}.\vec{B} = 0$

7. An inductor of inductance L, a capacitor of capacitance C and a resistor of resistance 'R' are connected in series to an ac source of potential difference 'V' volts as shown in figure. Potential difference across L, C and R is 40 V, 10 V and 40 V, respectively. The amplitude of current flowing through LCR series circuit is $10\sqrt{2}$A. The impedance of the circuit is

1) $4\sqrt{2}\,\Omega$ 2) $5/\sqrt{2}\,\Omega$ 3) 4Ω 4) 5Ω
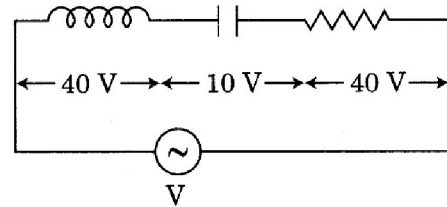
Ans. 4

Sol. $i_{rms} = \dfrac{V_{rms}}{Z} \Rightarrow Z = \dfrac{\sqrt{(40-10)^2 + 40^2}}{10}$

8. The number of photons per second on an average emitted by the source of monochromatic light of wavelength 600 nm, when it delivers the power of 3.3×10^{-3} watt will be : $\left(h = 6.6 \times 10^{-34} \text{Js}\right)$

1) 10^{18} 2) 10^{17} 3) 10^{16} 4) 10^{15}

Ans. 3

Sol. $P = \dfrac{N}{t} \dfrac{hc}{\lambda}$

9. An electromagnetic wave of wavelength 'λ' is incident on a photosensitive surface of negligible work function. If 'm' mass is of photoelectron emitted from the surface has de-Broglie wavelength λ_d, then:

1) $\lambda = \left(\dfrac{2m}{hc}\right)\lambda_d^{\ 2}$ 2) $\lambda_d = \left(\dfrac{2mc}{h}\right)\lambda^2$

3) $\lambda = \left(\dfrac{2mc}{h}\right)\lambda_d^{\ 2}$ 4) $\lambda = \left(\dfrac{2h}{mc}\right)\lambda_d^{\ 2}$

Ans. 3

Sol. $KE = E$

$\dfrac{P^2}{2m} = \dfrac{hc}{\lambda}, \ \dfrac{h^2}{\lambda_d^{\ 2} 2m} = \dfrac{hc}{\lambda}$

10. **Column-I** gives certain physical terms associated with flow of current through a metallic conductor.
Column-II gives some mathematical relations involving electrical quantities. Match **Column-I** and **Column-II** with appropriate relations.

Column-I		Column-II
(A) Drift Velocity	(P)	$\dfrac{m}{ne^2\rho}$
(B) Electrical Resistivity	(Q)	nev_d
(C) Relaxation Period	(R)	$\dfrac{eE}{m}\tau$
(D) Current Density	(S)	$\dfrac{E}{J}$

1) (A)-(R), (B)-(S), (C)-(P), (D)-(Q)
2) (A)-(R), (B)-(S), (C)-(Q), (D)-(P)
3) (A)-(R), (B)-(P), (C)-(S), (D)-(Q)
4) (A)-(R), (B)-(Q), (C)-(S), (D)-(P)

Ans. 1
Sol. Conceptual

11. The escape velocity from the Earth's surface is v. The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is:
1) v 2) $2v$ 3) $3v$ 4) $4v$

Ans. 4

Sol. $V = \sqrt{2gR} = R\sqrt{\dfrac{8}{3}\pi\rho G}$, $V \propto R$

12. The velocity of a small ball of mass M and density d, when dropped in a container filled with glycerine becomes constant after some time. If the density of glycerine is $\dfrac{d}{2}$, then the viscous force acting on the ball will be:
1) $\dfrac{Mg}{2}$ 2) Mg   3) $\dfrac{3}{2}Mg$ 4) 2Mg

Ans. 1

Sol. $F_V = Mg - F_B = Mg - V\dfrac{d}{2}g = Mg - \dfrac{Mg}{2} = \dfrac{Mg}{2}$

13. A body is executing simple harmonic motion with frequency 'n', the frequency of its potential energy is:
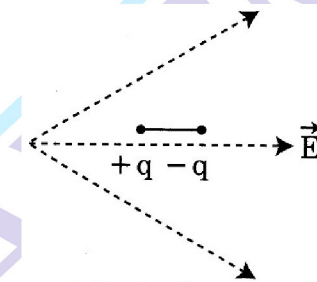1) n   2) 2n   3) 3n   4) 4n

Ans. 2
Sol. Conceptual

14. Water falls from a height of 60 m at the rate of 15 kg/s to operate a turbine. The lasses due to frictional force are 10% of the input energy. How much power is generated by the turbine? $(g=10m/s^2)$
1) 10.2 kW   2) 8.1 kW
3) 12.3 kW   4) 7.0 kW

Ans. 2

Sol. $P = \dfrac{90}{100}\dfrac{Mgh}{t}$

15. A dipole is placed in an electric field as shown. In which direction will it move?

1) towards the left as its potential energy will increase.
2) towards the right as its potential energy will decrease.
3) towards the left as its potential energy will decrease.
4) towards the right as its potential energy will increase.

Ans. 2
Sol. $U = -PE\cos\theta$, $\left(\theta = 180^\circ\right)$

16. A capacitor of capacitance 'C', is connected across an ac source of voltage V, given by $V = V_0 \sin\omega t$
The displacement current between he plates of the capacitor, would then be given by:
1) $I_d = V_0\omega C\cos\omega t$ 2) $I_d = \dfrac{V_0}{\omega C}\cos\omega t$
3) $I_d = \dfrac{V_0}{\omega C}\sin\omega t$ 4) $I_d = V_0\omega C\sin\omega t$

Ans. 1

Sol. $I_d = C\dfrac{dv}{dt} = C\dfrac{d(V_0\sin\omega t)}{dt} = V_0\omega C\cos\omega t$

17. A cup of coffee cools from $90°C$ to $80°C$ in t minutes, when the room temperature is $20°C$. The time taken by a similar cup of coffee to cool from $80°C$ to $60°C$ at a room temperature same at $20°C$ is:

1) $\dfrac{13}{10}t$ 2) $\dfrac{13}{5}t$ 3) $\dfrac{10}{13}t$ 4) $\dfrac{5}{13}t$

Ans. 2

Sol. $\dfrac{\theta_1 - \theta_2}{t} = -k\left(\dfrac{\theta_1 + \theta_2}{2} - \theta_0\right)$

18. The effective resistance of parallel connection that consists of four wires of equal length, equal area of cross-section and same material is $0.25\,\Omega$. What will be the effective resistance if they are connected in series?

1) $0.25\,\Omega$ 2) $0.5\,\Omega$ 3) $1\,\Omega$ 4) $4\,\Omega$

Ans. 4

Sol. $R_P = \dfrac{R}{n} \Rightarrow 0.25 = \dfrac{R}{4} \Rightarrow R = 1\,\Omega$

$R_S = nR = 4 \times 1 = 4\,\Omega$

19. Match **Column-I** and **Column-II** and choose the **correct** match from the given choices.

	Column-I		Column-II
(A)	Root mean square speed of gas molecules	(P)	$\dfrac{1}{3}nm\bar{v}^2$
(B)	Pressure exerted by ideal gas	(Q)	$\sqrt{\dfrac{3RT}{M}}$
(C)	Average kinetic energy of a molecule	(R)	$\dfrac{5}{2}RT$
(D)	Total internal energy of 1 mole of a diatomic gas	(S)	$\dfrac{3}{2}k_BT$

1) (A)-(R), (B)-(P), (C)-(S), (D)-(Q)
2) (A)-(Q), (B)-(R), (C)-(S), (D)-(P)
3) (A)-(Q), (B)-(P), (C)-(S), (D)-(R)
4) (A)-(R), (B)-(Q), (C)-(P), (D)-(S)

Ans. 3

Sol. Conceptual

20. A small block slides down on a smooth inclined plane, starting form rest at time $t = 0$. Let S_n be the distance travelled by the block in the interval $t = n - 1$ to $t = n$. Then, the ratio $\dfrac{S_n}{S_{n+1}}$ is:

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

Ans. 2

Sol. $\dfrac{S_n}{S_{n+1}} = \dfrac{g\left(n - \dfrac{1}{2}\right)}{g\left(n + 1 - \dfrac{1}{2}\right)}$

21. A radioactive nucleus $^A_Z X$ undergoes spontaneous decay in the sequence $^A_Z X \rightarrow_{Z-1} B \rightarrow_{Z-3} C \rightarrow_{Z-2} D$, where Z is the atomic number of element X. The possible decay particles in the sequence are:

1) α, β^-, β^+ 2) α, β^+, β^- 3) β^+, α, β^- 4) β^-, α, β^+

Ans. 3

Sol. Conceptual

22. A screw gauge gives the following readings when used to measure the diameter of a wire

Main scale reading : 0 mm

Circular scale reading : 52 divisions

Given that 1 mm on main scale correspond to 100 divisions on the circular scale. The diameter of the wire from the above date is:

1) 0.52 cm   2) 0.026 cm
3) 0.26 cm   4) 0.052 cm

Ans. 4

Sol. $T.R. = M.S.R + (H.S.R \times L.C)$

23. A parallel place capacitor has a uniform electric field '$\vec{E}$' in the space between the plates. If the distance between the plates is 'd' and the area of each plate is 'A', the energy stored in the capacitor is : (ε_0 = permittivity of free space)

1) $\dfrac{1}{2}\varepsilon_0 E^2$ 2) $\varepsilon_0 EAd$

3) $\dfrac{1}{2}\varepsilon_0 E^2 Ad$ 4) $\dfrac{E^2 Ad}{\varepsilon_0}$

Ans. 3

Sol. $U = \dfrac{1}{2}Cv^2 = \dfrac{1}{2}\varepsilon_0 E^2 Ad$

24. The electron concentration in an n-type semiconductor is the same as hole concentration in a p-type semiconductor. An external field (electric) is applied across each of them. Compare the current in them.
    1) current in n-type = current in p-type.
    2) current in p-type > current in n-type.
    3) current in n-type > current in p-type.
    4) No current will flow in p-type, current will only flow in n-type.

Ans. 3

**Sol.** Mobility of electrons is more than holes

25. A convex lens 'A' of focal length 20 cm and a concave lens 'B' of focal length 5 cm are kept along the same axis with a distance 'd' between them. If a parallel beam of light falling on 'A' leaves 'B' as a parallel beam, then the distance 'd' in cm will be:
    1) 25　　　2) 15　　　3) 50　　　4) 30

Ans. B

Sol. $d = f_1 - f_2$

26. Find the value of the angle of emergence from the prism. Refractive index of the glass is $\sqrt{3}$.

    1) 60^0　　　2) 30^0　　　3) 45^0　　　4) 90^0

Ans. 1

Sol. $i_i = r_1 = 0$
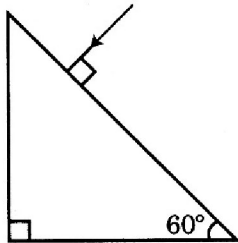
   $r_2 = 30^0, \mu = \dfrac{\sin i_2}{\sin r_2}$

27. Consider the following **statements (A)** and **(B)** and identify the **correct** answer.
    (A) A Zener diode is connected in reverse bias, when used as a voltage regulator.
    (B) The potential barrier of p-n junction lies between 0.1 V to 0.3 V.
    1) **(A)** and **(B)** both are correct
    2) **(A)** and **(B)** both are incorrect
    3) **(A)** is correct and **(B)** is incorrect
    4) **(A)** is incorrect but **(B)** is correct

Ans. 3

Sol. Conceptual

28. Two charged spherical conductors of radius R_1 and R_2 are connect by a wire. Then the ratio of surface charge densities of the spheres (σ_1 / σ_2) is:
    1) $\dfrac{R_1}{R_2}$　　　2) $\dfrac{R_2}{R_1}$　　　3) $\sqrt{\left(\dfrac{R_1}{R_2}\right)}$　　　4) $\dfrac{R_1^2}{R_2^2}$

Ans. 2

Sol. $\dfrac{\sigma_1}{\sigma_2} = \dfrac{q_1}{q_2}\left(\dfrac{R_2}{R_1}\right)^2$

   $k\dfrac{q_1}{R_1} = v = k\dfrac{q_2}{R_2} \Rightarrow \dfrac{q_1}{q_2} = \dfrac{R_1}{R_2}$

29. If force [F], acceleration [A] and time [T] are chosen as the fundamental physical quantities. Find the dimensions of energy.
    1) $[F][A][T]$　　　2) $[F][A]\left[T^2\right]$
    3) $[F][A]\left[T^{-1}\right]$　　　4) $[F]\left[A^{-1}\right][T]$

Ans. 2

Sol. Conceptual

30. If E and G respectively denote energy and gravitational constant, then $\dfrac{E}{G}$ has the dimensions of:
    1) $\left[M^2\right]\left[L^{-1}\right]\left[T^0\right]$　　　2) $[M]\left[L^{-1}\right]\left[T^{-1}\right]$
    3) $[M]\left[L^0\right]\left[T^0\right]$　　　4) $\left[M^2\right]\left[L^{-2}\right]\left[T^{-1}\right]$

Ans. 1

Sol. Conceptual

31. A lens of large focal length and large aperture is best suited as an objective of an astronomical telescope since
    1) A larger aperture contributes to the equality and visibility of the images
    2) A large area of the objective ensures better light gathering power
    3) A large aperture provides a better resolution
    4) All of the above

Ans. 4

Sol. Conceptual

32. A nucleus with mass number 240 breaks into two fragments each of mass number 120, the binding energy per nucleon of unfragmented nuclei is 7.6 MeV while that of fragments is 8.5 MeV. The total gain the Binding Energy in the process is
1) 0.9 MeV   2) 9.4 MeV
3) 804 MeV   4) 216 MeV

Ans. 4

Sol. $B.E = (2 \times 120 \times 8.5) - (240 \times 7.6)$ MeV

33. A particle is released from height S from the surface to the Earth. At a certain height its kinetic energy is three times its potential energy. The height from the surface of earth and the speed of the particle at that instant are respectively

1) $\dfrac{S}{4}, \dfrac{3gS}{2}$ 2) $\dfrac{S}{4}, \dfrac{\sqrt{3gS}}{2}$

3) $\dfrac{S}{2}, \dfrac{\sqrt{3gS}}{2}$ 4) $\dfrac{S}{4}, \sqrt{\dfrac{3gS}{2}}$

Ans. 4

Sol. $\dfrac{PE}{KE} = \dfrac{h}{S-h} \Rightarrow \dfrac{PE}{3PE} = \dfrac{h}{S-h} \Rightarrow h = \dfrac{S}{4}$

$V = \sqrt{2g\dfrac{3s}{4}}$

34. The half-life of a radioactive nuclide is 100 hours. The fraction of original activity that will remain after 150 hours would be

1) 1/2   2) $\dfrac{1}{2\sqrt{2}}$ 3) $\dfrac{2}{3}$ 4) $\dfrac{2}{3\sqrt{2}}$

Ans. 2

Sol. $N = N_0 \left(\dfrac{1}{2^{t/T}}\right)$, $t = \dfrac{3T}{2}$

35. A spring is stretched by 5 cm by a force 10N. The time period of the oscillations when a mass of 2kg is suspended by it is
1) 0.0628 s   2) 6.28 s
3) 3.14 s   4) 0.628 s

Ans. 4

Sol. $K = \dfrac{F}{x}$, $T = 2\pi\sqrt{\dfrac{m}{k}}$

PHYSICS - SECTION - B

36. A series LCR circuit containing 5.0 H inductor, $80\mu F$ capacitor and 40Ω resistor is connected to 230V variable frequency ac source. The angular frequencies of the at which power transferred to the circuit is half the power at the resonant angular frequency are likely to be
1) 25 rad/s and 75 rad/s
2) 50 rad/s and 25 rad/s
3) 46 rad/s and 54 rad/s
4) 42 rad/s and 58 rad/s

Ans. 3

Sol. $\omega = \left(\sqrt{\left(\dfrac{R}{2L}\right)^2 + \dfrac{1}{LC}}\right) \pm \dfrac{R}{2L}$

37. The conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 \gg R_2$, the mutual inductance M between them will be directly proportional to

1) $\dfrac{R_1}{R_2}$ 2) $\dfrac{R_2}{R_1}$ 3) $\dfrac{R_1^2}{R_2}$ 4) $\dfrac{R_2^2}{R_1}$

Ans. 4

Sol. $N\phi = Mi \Rightarrow NBA_2 = Mi$

$\dfrac{N\mu_0 i}{2R_1}\pi R^2 = Mi$

38. A ball of mass 0.15 kg is dropped from a height 10 m, strikes the ground and rebounds to the same height. The magnitude of impulse imparted to the ball is $(g = 10m/s^2)$ nearly
1) 0 kg m/s   2) 4.2 kg m/s
3) 2.1 kg m/s   4) 1.4 kg m/s

Ans. 2

Sol. $J = \Delta P = m\left(\sqrt{2gh_2} + \sqrt{2gh_1}\right), (h_1 = h_2)$

39. A point object is placed at a distance of 60 cm from a convex lens of focal length 30 cm. If a plane mirror were put perpendicular to the principal axis of the lens and at a distance of 40 cm from it, the final image would be formed at a distance of
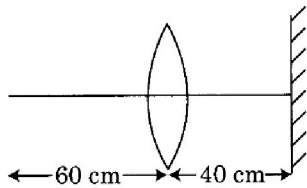
1) 20 cm from the lens, it would be a real image
2) 30 cm from the lens, it would be a real image
3) 30 cm from the plane mirror, it would be virtual image
4) 20 cm from the plane mirror, it would be a virtual image

Ans. 1

Sol. $\dfrac{1}{V} - \dfrac{1}{u} = \dfrac{1}{f} \Rightarrow \dfrac{1}{V} - \dfrac{1}{-60} = \dfrac{1}{30} \Rightarrow V = 60cm$
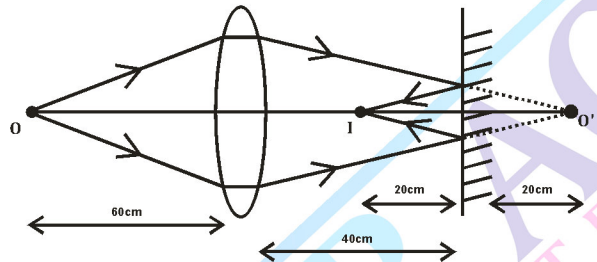
This virtual image acts as an object for plane mirror and final image is formed at 20cm from the lens, it would be a real image

40. A uniform conducting wire of length 12a and resistance 'R' is wound up as a current carrying coil in the shape of
(i) An equilateral triangle of side 'a'
(ii) A square of side 'a'
The magnetic dipole moments of the coil in each case respectively are
1) $\sqrt{3}Ia^2$ and $3Ia^2$ 2) $3Ia^2$ and Ia^2
3) $3Ia^2$ and $4Ia^2$ 4) $4Ia^2$ and $3Ia^2$

Ans. 1

Sol. $M = niA$

For equilateral triangle n =4, $A = \dfrac{1}{2}a\dfrac{\sqrt{3}}{2}a$

For square n=3, $A = a^2$

41. A car starts from rest and accelerates at 5 m/s². At t=4s, a ball is dropped out of a window by a person sitting in the car. What is the velocity and acceleration of the ball at t=6s? (Take g=10 m/s²)
1) 20 m/s, 5 m/s²   2) 20 m/s, 0
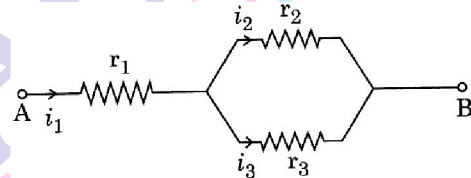3) $20\sqrt{2}\,m/s,0$ 4) $20\sqrt{2}\,m/s,10\,m/s^2$

Ans. 4

Sol. $V_x = a_x t = 20$
$V_y = gt = 10(6-4)$
$V = \sqrt{V_x^2 + V_y^2}, a = g$

42. Three resistor having resistances r_1, r_2 and r_3 are connected as shown in the given circuit. The ratio $\dfrac{i_3}{i_1}$ of currents in terms of resistance use in the circuit is

1) $\dfrac{r_1}{r_2 + r_3}$ 2) $\dfrac{r_2}{r_2 + r_3}$ 3) $\dfrac{r_1}{r_1 + r_2}$ 4) $\dfrac{r_2}{r_1 + r_3}$

Ans. 2

Sol. $i_3 = i_1 \left(\dfrac{r_2}{r_2 + r_3} \right)$

43. A particle of mass 'm' is projected with a velocity $v = kV_e\,(k<1)$ from the surface of earth (V_e=escape velocity)
The maximum height above the surface reached by the particle is
1) $R\left(\dfrac{k}{1-k}\right)^2$ 2) $R\left(\dfrac{k}{1+k}\right)^2$ 3) $\dfrac{R^2k}{1+k}$ 4) $\dfrac{Rk^2}{1-k^2}$

Ans. 4

Sol. $\dfrac{1}{2}mK^2V_e^2 = \dfrac{mgh}{\left(1+\dfrac{h}{R}\right)}$

44. A step down transformer connected to an ac mains supply of 220 V is made to operated at 11V, 44W lamp. Ignoring power losses in the transformer, what is the current in the primary circuit.
1) 0.2A   2) 0.4A   3) 2A   4) 4A

Ans. 1

Sol. $P_{Out} = P_{In} \Rightarrow 44 = i_p (220)$

45. Twenty seven drops of same size are charge at 220V each. They combine to form a bigger drop. Calculate the potential of the bigger drop
    1) 660V   2) 1320V   3) 1520V   4) 1980V

Ans. 4

Sol. $V' = n^{2/3}V$

46. For the given circuit, the input digital signals are applied at the terminals A, B and C. What would be the out put at the terminal y?

1) ![option 1]
2) ![option 2]
3) ![option 3]
4) ![option 4]
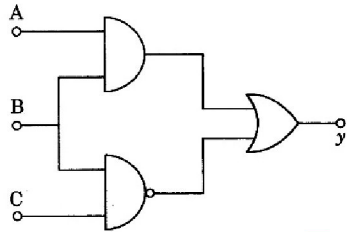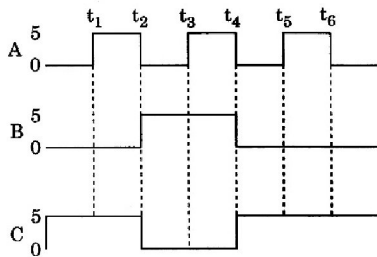
Ans. 3

Sol. $Y = A.B + \overline{B.C}$

47. A particle moving in a circle of radius R with a uniform speed takes a time T to complete one revolution.
    If this particle were projected with the same speed at an angle 'θ' to the horizontal, the maximum height attained by it equals 4R. The angle of projection, θ, is then given by

1) $\theta = \cos^{-1}\left(\dfrac{gT^2}{\pi^2 R}\right)^{1/2}$ 2) $\theta = \cos^{-1}\left(\dfrac{\pi^2 R}{gT^2}\right)^{1/2}$

3) $\theta = \sin^{-1}\left(\dfrac{\pi^2 R}{gT^2}\right)^{1/2}$ 4) $\theta = \sin^{-1}\left(\dfrac{2gT^2}{\pi^2 R}\right)^{1/2}$

Ans. 4

Sol. $u = \dfrac{2\pi R}{T}, H = \dfrac{u^2 \sin^2 \theta}{2g}$

48. From a circular ring of mass 'M' and radius 'R' an arc corresponding to a 90⁰ sector is removed. The moment of inertia of the remaining part of the ring about an axis passing through the centre of the ring and perpendicular to the plane of the rings 'K' time 'MR²'. Then the value of 'K' is

1) $\dfrac{3}{4}$ 2) $\dfrac{7}{8}$ 3) $\dfrac{1}{4}$ 4) $\dfrac{1}{8}$

Ans. 1

Sol. $I_{Remaining} = I_{original} - I_{removed} \Rightarrow MR^2 - \dfrac{MR^2}{4}$

49. A uniform rod of length 200 cm and mass 500g is balanced on the wedge placed at 40 cm mark. A mass of 20 kg is suspended from the rod at 20 cm and another unknown mass 'm' is suspended from the rod at 160 cm mark as shown in the figure. Find the value of 'm' such that the rod is in equilibrium. (g=10 m/s²)
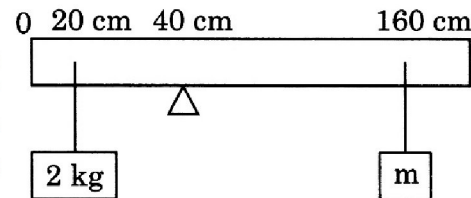
1) $\dfrac{1}{2}$ kg   2) $\dfrac{1}{3}$ kg   3) $\dfrac{1}{6}$ kg   4) $\dfrac{1}{12}$ kg

Ans. 4

Sol. Net torque is zero

$2g(20) = mg(120) + (0.5g)(60)$

50. In the product
    $\vec{F} = q(\vec{v} \times \vec{B}) = q\vec{v} \times (B\hat{i} + B\hat{j} + B_0\hat{k})$

    For   q=1   and $\vec{v} = 2\hat{i} + 4\hat{j} + 6\hat{k}$ and
    $\vec{F} = 4\hat{i} - 20\hat{j} + 12\hat{k}$

    What will be the complete expression for $\vec{B}$?

    1) $-8\hat{i} - 8\hat{j} - 6\hat{k}$ 2) $-6\hat{i} - 6\hat{j} - 8\hat{k}$

    3) $8\hat{i} + 8\hat{j} - 6\hat{k}$ 4) $6\hat{i} + 6\hat{j} - 8\hat{k}$

Ans. 2

Sol. $\vec{F} = q(\vec{v} \times \vec{B})$

CHEMISTRY - SECTION – A

51. The correct sequence of bond enthalpy of $C - X$ bond is:
   1) $CH_3 - F < CH_3 - Cl < CH_3 - Br < CH_3 - I$
   2) $CH_3 - F > CH_3 - Cl > CH_3 - Br > CH_3 - I$
   3) $CH_3 - F < CH_3 - Cl > CH_3 - Br > CH_3 - I$
   4) $CH_3 - Cl > CH_3 - F > CH_3 - Br > CH_3 - I$

Ans. 2

Sol. Conceptual (Bond energy or enthalpy $\frac{1}{\propto}$ to bond length)

52. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature?
   1) Electrolysis   2) Chromatography
   3) Distillation   4) Zone refining

Ans. 3

Sol. Conceptual

53. The correct option for the number of body centred unit cell in all 14 types of Bravais lattice unit cells is:
   1) 7   2) 5   3) 2   4) 3

Ans. 4

Sol. Body centred unit cell is possible in (i) cubic (ii) Tetragonal (iii) Orthorhombic

54. Among the following alkaline earth metal halides, one which is covalent and soluble in organic solvents is:
   1) Calcium chloride   2) Strontium chloride
   3) Magnesium chloride 4) Beryllium chloride

Ans. 4

Sol. Conceptual

55. $Zr(Z = 40)$ and $Hf(Z = 72)$ have similar atomic and ionic radii because of:
   1) belonging to same group
   2) diagonal relationship
   3) lanthanoid contraction
   4) having similar chemical properties
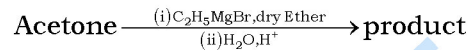
Ans. 3

Sol. Conceptual

56. The maximum temperature than can be achieved in blast furnace is:
   1) upto 1200K   2) upto 2200K
   3) upto 1900K   4) upto 5000K

Ans. 2

Sol. Conceptual

57. What is the IUPAC name of the organic compound formed in the following chemical reaction?

   $$Acetone \xrightarrow[\text{(ii)}H_2O,H^+]{\text{(i)}C_2H_5MgBr,dry\,Ether} product$$

   1) 2-methyl propan-2-ol
   2) pentan-2-ol
   3) pentan-3-ol
   4) 2-methyl butan-2-ol

Ans. 4

Sol. Ketones on reaction with Grignard reagent gives tertiary alcohals.
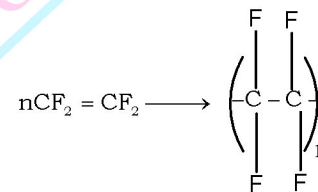

58. Which one of the following polymers is prepared by addition polymerisation?
   1) Teflon   2) Nylon-66
   3) Novolac   4) Dacron

Ans. 1

Sol. Teflon

59. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are:
   1) 8,4   2) 6,12   3) 2,1   4) 12,6

Ans. 4

Sol. Hexagonal primitive unit cell has '6' atoms per unit cell Z = 6
   ∴ Tetrahedral voids = 2N = 12
   Octahedral voids = N = 6

60. **Statement** – I : Acid strength increases in the order given as HF << HCl << HBr << HI

    Statement – II : As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases.

    1) Both **Statement I** and **Statement II** are true

    2) Both **Statement I** and **Statement II** are false

    3) **Statement I** is correct but **Statement II** is false

    4) **Statement I** is incorrect but **Statement II** is true
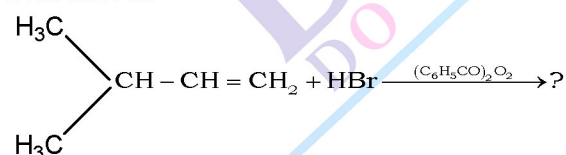
Ans. 1

Sol. Conceptual

61. The incorrect **Statement** among the following is:

    1) Actinoid contraction is greater for element to element than Lanthanoid contraction.

    2) Most of the trivalent Lanthanoid ions are colorless in the solid state.

    3) Lanthanoids are good conductors of heat and electricity.

    4) Actinoids are highly reactive metals especially when finely divided.
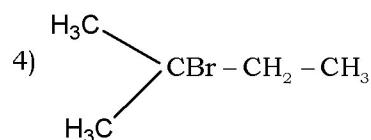
Ans. 2

Sol. Conceptual

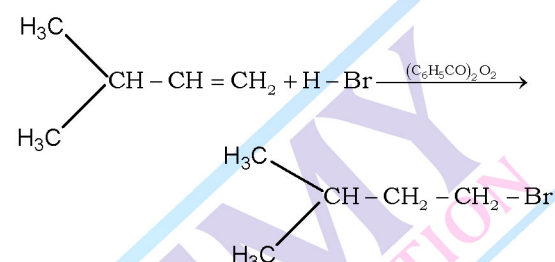62. The major product of the following chemical reaction is:

$$
\begin{array}{c}
H_3C \\
 \diagdown \\
 CH - CH = CH_2 + HBr \xrightarrow{(C_6H_5CO)_2O_2} ? \\
 \diagup \\
H_3C
\end{array}
$$

1) $(H_3C)_2CH - CH_2 - CH_2 - Br$

2) $(H_3C)_2CH - CH_2 - CH_2 - O - COC_6H_5$

3) $(H_3C)_2CH - CH(Br) - CH_3$

4) $(H_3C)_2CBr - CH_2 - CH_3$

Ans. 1

Sol.

$$
(H_3C)_2CH - CH = CH_2 + H - Br \xrightarrow{(C_6H_5CO)_2O_2} (H_3C)_2CH - CH_2 - CH_2 - Br
$$

This mechanism is free radical and it follows antimarkonicov's rule.

63. The structures of beryllium chloride in solid state and vapour phase, are:

    1) Chain and dimer, respectively

    2) Linear in both

    3) Dimer and Linear, respectively

    4) Chain in both

Ans. 1

Sol. Conceptual (NCERT text book)

64. Given below are two statements:

    Statement – I : Aspirin and Paracetamol belong to the class of narcotic analgesics.

    Statement – II : Morphine and Heroin are non-narcotic analgesics.

    1) Both **Statement I** and **Statement II** are true

    2) Both **Statement I** and **Statement II** are false

    3) **Statement I** is correct but **Statement II** is false

    4) **Statement I** is incorrect but **Statement II** is true

Ans. 2

Sol. Conceptual

65. An organic compound contain 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is: (Atomic weight of C is 12, H is 1)
    1) CH   2) CH_2 3) CH_3 4) CH_4

Ans. 3
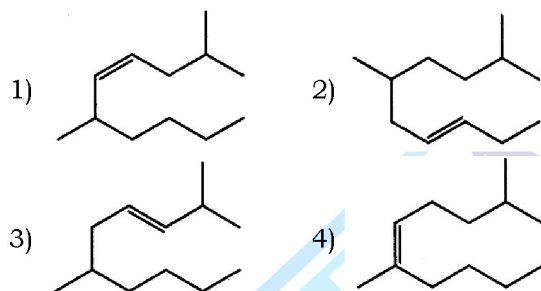
Sol. C : H

$$\frac{78}{12} : \frac{22}{1}$$

$6.5 : 22$

$$\frac{6.5}{6.5} : \frac{22}{6.5}$$

$1 : 3.38$

$\cong 1 : 3$

$\therefore CH_3$

66. The correct structure of 2,6-dimethyl-dec-4-ene is:

    1)   2)

   3)   4)

Ans. 1

Sol. Based on IUPAC rules.

67. The major product formed in dehydrohalogenation reaction of 2-Bromo pentane is Pent-2-ene. This product formation is based on?
    1) Sayzeffs rule   2) Hund's rule
    3) Hofmann rule   4) Huckel's rule

Ans. 1

Sol. Dehydro halogenation followed by Saytzeff's rule.

68. For a reaction $A \rightarrow B$ enthalpy of reaction is $-4.2 kJmol^{-1}$ and enthalpy of activation is $9.6 kJmol^{-1}$. The correct potential energy profile for the reaction is shown in option.

    1) 2) 3) 4)
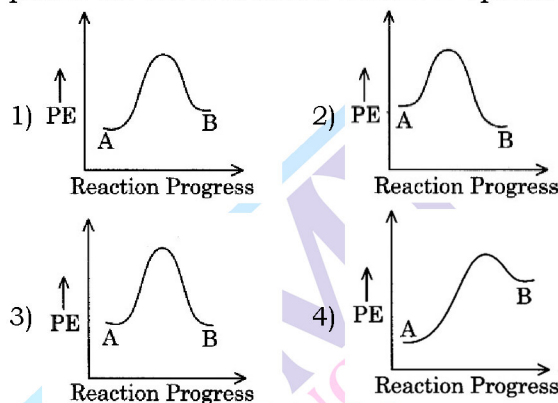
Ans. 2

Sol. $\Delta H = -ve_{(exothermic)}$

For exothermic reaction $PE_{(R)} > PE_{(P)}$

$\left(E_a\right)_f < \left(E_a\right)_b$

69. Ethylene diaminetetraacetate (EDTA) ion is:
    1) Hexadentate ligand with four 'O' and two 'N' donor atoms.
    2) Unidentate ligand
    3) Bidentate ligand with two 'N' donor atoms.
    4) Tridentate ligand with three 'N' donor atoms.

Ans. 1

Sol. Conceptual

70. Noble gases are named because of their inertness towards reactivity. Identify an **incorrect** statement about them.
    1) Noble gases are sparingly soluble in water
    2) Noble gases have very high melting and boiling points.
    3) Noble gases have weak dispersion forces.
    4) Noble gases have large positive values of electron gain enthalpy.

Ans. 2

Sol. Conceptual

71. Which of the following reactions is the metal displacement reaction? Choose the right option.
    1) $2KClO_3 \xrightarrow{\Delta} 2KCl + 3O_2$
    2) $Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$
    3) $Fe + 2HCl \rightarrow FeCl_2 + H_2 \uparrow$
    4) $2Pb\left(NO_3\right)_2 \rightarrow 2PbO + 4NO_2 + O_2 \uparrow$
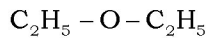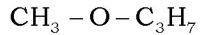
Ans. 2

Sol. Conceptual

72. The compound which shows metamerism is:
1) C_5H_{12} 2) C_3H_8O 3) C_3H_6O 4) $C_4H_{10}O$

Ans. 4

Sol. $C_4H_{10}O$ - shows metamerism.

$CH_3 - O - C_3H_7$

$C_2H_5 - O - C_2H_5$

Isomers with same molecular formula and same functional group but which shows difference in attached alkyl groups to the divalent atom or group.

73. The RBC deficiency is deficiency disease of
1) Vitamin B_{12} 2) Vitamin B_6
3) Vitamin B_1 4) Vitamin B_2

Ans. 1

Sol. RBC deficiency disease is vitamin B_{12}

74. Dihedral angle of least stable conformer of ethane is:
1) 120^0 2) 180^0 3) 60^0 4) 0^0

Ans. 4

Sol. Least stable conformer is eclipsed with dihedral angle is zero

75. Tritium a radioactive isotope of hydrogen, emits which of the following particles?
1) Beta (β^-) 2) Alpha (α)
3) Gamma (γ) 4) Neutron (n)

Ans. 1

Sol. Conceptual

76. Choose the correct option for graphical representation of Boyle's law, which shows graph of pressure vs volume of a gas at different temperature:
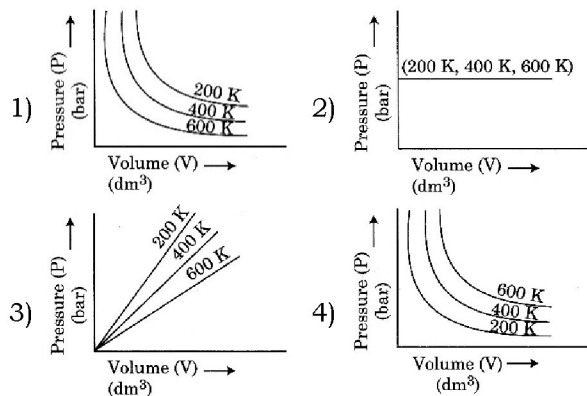
Ans. 4

Sol. $P \propto T$

$P \propto \dfrac{1}{V}$

77. The molar conductance of $NaCl$, HCl and CH_3COONa at infinite dilution are 126.45, 426.16 and 91.0 Scm^2mol^{-1} respectively. The molar conductance of CH_3COOH at infinite dilution is. Choose the right option for your answer.
1) $201.28\,Scm^2mol^{-1}$ 2) $390.71\,Scm^2mol^{-1}$
3) $698.28\,Scm^2mol^{-1}$ 4) $540.48\,Scm^2mol^{-1}$

Ans. 2

Sol. $\wedge^0_{m(CH_3COOH)} = \wedge^0_{m(CH_3COONa)} + \wedge^0_{m(HCl)} - \wedge^0_{m(NaCl)}$

$= 91 + 426.16 - 126.45$

$= 390.71\,Scm^2mol^{-1}$

78. The pK_b of dimethylamine and pK_a of acetic acid are 3.27 and 4.77 respectively at T(K). The correct option for the pH of dimethylammonium acetate solution is:
1) 8.50   2) 5.50   3) 7.75   4) 6.25

Ans. 3

Sol. $p^H = 7 + \dfrac{1}{2}\left[p^{K_a} - p^{K_b}\right]$ (Salt of weak acid and weak base)

$= 7 + \dfrac{1}{2}\left[4.77 - 3.27\right]$

$= 7.75$

79. Match List-I with List-II

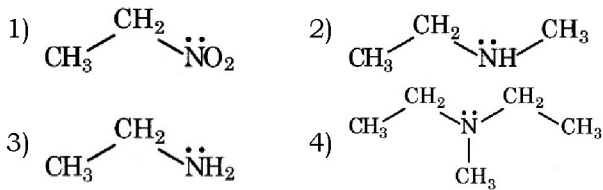| List-I	List-II
a. PCl_5	i. Square pyramidal
b. SF_6	ii. Trigonal planar
c. BrF_5	iii. Octahedral
d. BF_3	iv. Trigonal bipyramidal

Choose the correct answer from the options given below.
1) $a - iv; b - iii; c - i; d - ii$
2) $a - ii; b - iii; c - iv; d - i$
3) $a - iii; b - i; c - iv; d - ii$
4) $a - iv; b - iii; c - ii; d - i$

Ans. 1

Sol. Conceptual

80. Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali.

1) $CH_3-CH_2-\overset{..}{N}O_2$

2) $CH_3-CH_2-\overset{..}{N}H-CH_3$

3) $CH_3-CH_2-\overset{..}{N}H_2$

4) $CH_3-CH_2-\overset{..}{N}(CH_2-CH_3)-CH_3$

Ans. 3

Sol. Only Primary amines reacts with Hinsberg's reagent to give a solid which dissolves in alkali.

$\therefore CH_3CH_2NH_2$

81. The right option for the statement "Tyndall effect is exhibited by" is:

1) NaCl solution   2) Glucose solution

3) Starch solution   4) Urea solution

Ans. 3

Sol. Conceptual

82. BF_3 is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are:

1) sp^3 and 4   2) sp^3 and 6

3) sp^2 and 6   4) sp^2 and 8

Ans. 3

Sol. Conceptual

83. A particular station of All India Radio, New Delhi, broad casts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is:

(speed of light, $c = 3.0 \times 10^8 \, ms^{-1}$)

1) 219.3 m   2) 219.2 m

3) 2192 m   4) 21.92 cm

Ans. 1

Sol. $C = \vartheta\lambda$

$\lambda = \dfrac{C}{\vartheta}$

$= \dfrac{3 \times 10^8}{1368 \times 10^3} = 219.3m$

84. Which one among the following is the correct option for right relation between C_p and C_v for one mole of ideal gas?

1) $C_p + C_v = R$ 2) $C_p - C_v = R$

3) $C_p = RC_v$ 4) $C_v = RC_p$

Ans. 2

Sol. $C_p - C_v = R$

85. The following solutions were prepared by dissolving 10g of glucose $(C_6H_{12}O_6)$ in 250 ml of water (P_1), 10g of urea (CH_4N_2O) in 250 ml water (P_2) and 10g of sucrose $(C_{12}H_{22}O_{11})$ in 250 ml of water (P_3). The right option for the decreasing order of osmotic pressure of these solutions is:

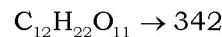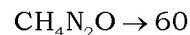1) $P_2 > P_1 > P_3$ 2) $P_1 > P_2 > P_3$

3) $P_2 > P_3 > P_1$ 4) $P_3 > P_1 > P_2$

Ans. 1

Sol. $\pi = CRT$

$\pi = \dfrac{W}{GMW} \times \dfrac{1000}{V_{(ml)}} \times R \times T$

$\pi \propto \dfrac{1}{GMW}$

$C_6H_{12}O_6 \rightarrow 180$

$CH_4N_2O \rightarrow 60$

$C_{12}H_{22}O_{11} \rightarrow 342$
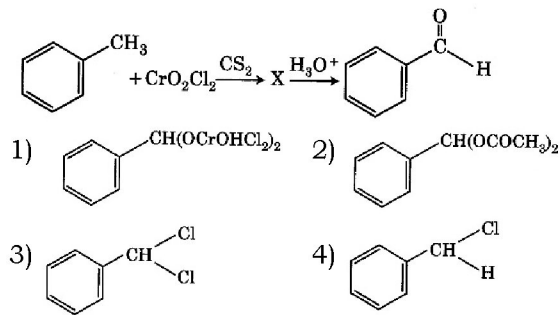
$\therefore \pi_{urea} > \pi_{glucose} > \pi_{sucrose}$

$P_2 > P_1 > P_3$

CHEMISTRY - SECTION – B

86. The intermediate compound 'X' in the following chemical reaction is:

1)   2)

3)   4)

Ans. 1

Sol.
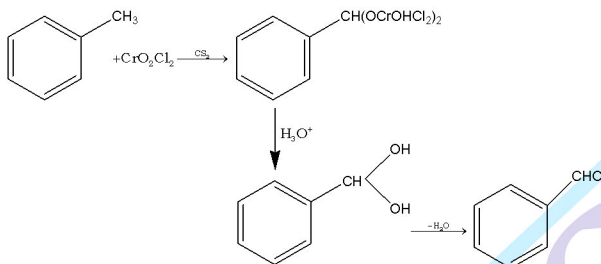
87. For irreversible expansion of an ideal gas under isothermal condition, the correct option is:

1) $\Delta U = 0, \Delta S_{total} = 0$ 2) $\Delta U \neq 0, \Delta S_{total} \neq 0$

3) $\Delta U = 0, \Delta S_{total} \neq 0$ 4) $\Delta U \neq 0, \Delta S_{total} = 0$

Ans. 3

Sol. For isothermal process $\Delta U = 0$

For irreversible process $\Delta S_{total} \neq 0$

88. Choose the correct option for the total pressure (in atm) in a mixture of 4g O_2 and 2g H_2 confined in a total volume of one litre at $0°C$ is: (Given : $R = 0.082\,L\,atm\,mol^{-1}\,K^{-1}$, T=273K)

1) 2.518   2) 2.602   3) 25.18   4) 26.02

Ans. 3

Sol. $PV = (n_1 + n_2)RT$

$P = \dfrac{(n_1 + n_2)RT}{V}$

$= \dfrac{\left(\dfrac{4}{32} + \dfrac{2}{2}\right) \times 0.082 \times 273}{1}$

$= 25.18$

89. The correct option for the value of vapour pressure of a solution at $45°C$ with benzene to octane in molar ratio 3:2 is:

[At $45°C$ vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume ideal gas)

1) 160 mm of Hg   2) 168 mm of Hg
3) 336 mm of Hg   4) 350 mm of Hg

Ans. 3

Sol. $P_{total} = P_1^0 X_1 + P_2^0 X_2$

$= 280 \times \dfrac{3}{5} + 420 \times \dfrac{2}{5}$

$= 336$ mm of Hg

90. The product formed in the following chemical reaction is:

1)   2)

3)   4)
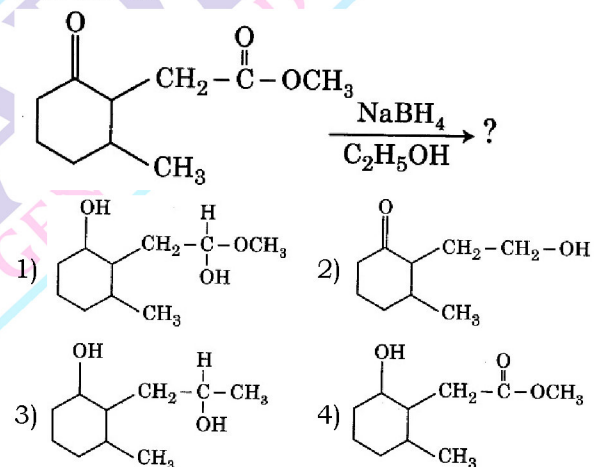
Ans. 4
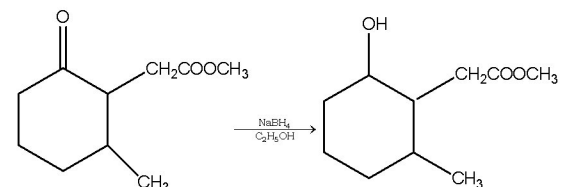
Sol.

$NaBH_4 -$ reduces only keto group but not ester group.

91. Which of the following molecules is non-polar in nature ?

1) $POCl_3$ 2) CH_2O 3) $SbCl_5$ 4) NO_2

Ans. 3

Sol. Conceptual

92. From the following pairs of ions which one is not an iso-electronic pair ?

1) O^{2-}, F^- 2) Na^+, Mg^{2+}

3) Mn^{2+}, Fe^{3+} 4) Fe^{2+}, Mn^{2+}

Ans. 4

Sol. Conceptual

93. The molar conductivity of 0.007M acetic acid is 20S cm^2 mol^{-1}. What is the dissociation constant of acetic acid ? Choose the correct option.

$$\begin{bmatrix} \Lambda^0_{H^+} = 350 \text{ S cm}^2 \text{ mol}^{-1} \\ \Lambda^0_{CH_3COO^-} = 50 \text{ S cm}^2 \text{ mol}^{-1} \end{bmatrix}$$

1) 1.75×10^{-4} mol L^{-1} 2) 2.50×10^{-4} mol L^{-1}

3) 1.75×10^{-5} mol L^{-1} 4) 2.50×10^{-5} mol L^{-1}

Ans. 3

Sol. $\wedge_m = 20$; $\wedge^0_m = \lambda^0_H + \lambda^0_{CH_3COO^-}$

$= 350 + 50 = 400$

$\alpha = \dfrac{\wedge_m}{\wedge^0_m} = \dfrac{20}{400} = 5 \times 10^{-2}$

$K_a = C\alpha^2 = 0.007 \times \left(5 \times 10^{-2}\right)^2$

$= 7 \times 10^{-3} \times 25 \times 10^{-4}$

$= 1.75 \times 10^{-5} \, mol L^{-1}$

94. The slope of Arrhenius Plot $\left(\ln k \, v/s \, \dfrac{1}{T}\right)$ of first order reaction is $-5 \times 10^3 K$. The value of E_a of the reaction is. Choose the correct option for your answer.

[Given R=8.314 JK^{-1} mol^{-1}]

1) 41.5 kJ mol^{-1} 2) 83.0 kJ mol^{-1}

3) 166 kJ mol^{-1} 4) -83 kJ mol^{-1}

Ans. 1

Sol. $\ln k = \ln A - \dfrac{E_a}{R} \times \dfrac{1}{T}$

$\quad y \quad\quad c \quad\quad m \quad\quad x$

$slope = -\dfrac{E_a}{R}$

$-5 \times 10^3 = -\dfrac{E_a}{8.314 \times 10^{-3}}$

$E_a = 5 \times 10^3 \times 8.314 \times 10^{-3}$

$= 41.5 \, kJ mol^{-1}$

95. The reagent 'R' in the given sequence of chemical reaction is :
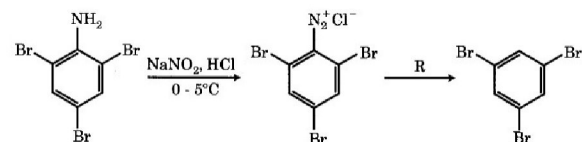
1) H_2O 2) CH_3CH_2OH

3) HI   4) CuCN/KCN

Ans. 2

Sol. R = CH_3CH_2OH

96. Match List - I with List – II

List-I	List-II
(a) $\xrightarrow[\text{CuCl}]{\text{CO, HCl} / \text{Anhyd.AlCl}_3}$	(i) Hell-Volhard-Zelinsky reaction
(b) $R-\overset{O}{\underset{\|\|}{C}}-CH_3 + NaOX \rightarrow$	(ii) Gattermann – Koch reaction
(c) $R-CH_2-OH + R'COOH \xrightarrow{\text{Conc.H}_2\text{SO}_4}$	(iii) Halofrom reaction
(d) $R-CH_2COOH \xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) X}_2/\text{Red P}}$	(iv) Esterificaiton

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

Ans. 4

Sol. Conceptual

97. Match List-I with List – II.

List-I	List-II
(a) $2SO_2(g) + O_2(g) \rightarrow 2SO_3(g)$	(i) Acid rain
(b) $HOCl(g) \xrightarrow{hv} \overset{.}{O}H + \overset{.}{C}l$	(ii) Smog
(c) $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	(iii) Ozone depletion
(d) $NO_2(g) \xrightarrow{hv} NO(g) + O(g)$	(iv) Tropospheric pollution

Choose the correct answer from the options given below.

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

Ans. 3

Sol. Conceptual

98.

$CH_3CH_2COO^-Na^+ \xrightarrow[\text{Heat}]{\text{NaOH, +?}} CH_3CH_3 + Na_2CO_3$

Consider the above reaction and Identify the missing reagent / chemical.

1) B_2H_6 2) Red Phosphorus

3) CaO   4) DIBALH

Ans. 3

Sol. $CH_3-CH_2-COONa \xrightarrow[\Delta]{\text{NaOH+CaO}}$
$CH_3-CH_3 + Na_2CO_3$

99. Match List – I with List-II.
   List-I   List-II
   (a) $[Fe(CN)_6]^{3-}$ (i) 5.92 BM
   (b) $[Fe(H_2O)_6]^{3+}$ (ii) 0 BM
   (c) $[Fe(CN)_6]^{4-}$ (iii) 4.90 BM
   (d) $[Fe(H_2O)_6]^{2+}$ (iv) 1.73 BM
   Choose the correct answer from the options given below.
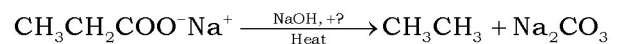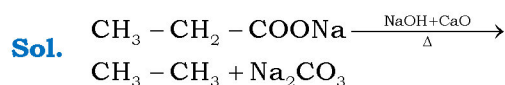   1) a-iv, b-ii, c-i, d-iii   2) a-ii, b-iv, c-iii, d-i
   3) a-i, b-iii, c-iv, d-ii   4) a-iv, b-i, c-ii, d-iii

Ans. 4

Sol. Conceptual

100. In which one of the following arrangements the given sequence is not strictly according to the properties indicated against it ?
   1) HF<HCl<HBr<HI : Increasing acidic strength
   2) $H_2O<H_2S<H_2Se<H_2Te$: Increasing pK_a values
   3) $NH_3<PH_3<AsH_3<SbH_3$: Increasing acidic character
   4) $CO_2<SiO_2<SnO_2<PbO_2$: Increasing oxidizing power

Ans. 2

Sol. Conceptual

BOTANY - SECTION – A

101. Match List-I with List-II

	List-I		List-II
(a)	Protoplast fusion	(i)	Totipotency
(b)	Plant tissue culture	(ii)	Pomato
(c)	Meristem culture	(iii)	Somaclones
(d)	Micropropagation	(iv)	Virus free plants

   Choose the correct answer from the options given below

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

Ans. 2

102. In the equation GPP-R=NPP.
   Represents
   1) Radiant energy   2) Retardation factor
   3) Environment factor 4) Respiration losses

Ans. 4

103. Which of the following are not secondary metabolites in plants?
   1) Morphine, codeine
   2) Amino acids, Glucose
   3) Vinblastin, Curcumin
   4) Rubber, Gums

Ans. 2

104. The factor that leads to Founder effect in a population is:
   1) Natural selection
   2) Genetic recombination
   3) Mutation
   4) Genetic drift

Ans. 4

105. Amensalism can be represented as:
   1) Species A(-); Species B(0)
   2) Species A(+); Species B(+)
   3) Species A(-); Species B(-)
   4) Species A(+); Species B(0)

Ans. 1

106. A typical angiosperm embryo sac at maturity is :
   1) 8-nucleate and 7-celled
   2) 7-nucleate and 8-celled
   3) 7-nucleate and 7-celled
   4) 8-nucleate and 8-celled

Ans. 1

107. During the purification process for recombinant DNA technology, addition of chilled ethanol precipitates out:
   1) RNA   2) DNA
   3) Histones   4) Polysaccharids

Ans. 2

108. Gemmae are present in:
   1) Mosses   2) Pteridophytes
   3) Some Gymnosperms 4) Some Liverworts

Ans. 4

109. Which of the following stages of meiosis involves division of centromere?
   1) Metaphase I   2) Metaphase II
   3) Anaphase II   4) Telophase II

Ans. 3

110. Match List-I with List-II

	List-I		List-II
(a)	Lenticels	(i)	Phellogen
(b)	Cork cambium	(ii)	Suberin deposition
(c)	Secondary cortex	(iii)	Exchange of gases
(d)	Cork	(iv)	Phelloderm

Choose the correct answer from the options given below

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

Ans. 2

111. Plants follow different pathways in response to environment or phases of life to form different kinds of structures. This ability is called:
1) Elasticity
2) Flexibility
3) Plasticity
4) Maturity

Ans. 3

112. The term used of transfer of pollen grains from anthers of one plant to stigma of a different pant which, during pollination, brings genetically different types of pollen grains to stigma, is:
1) Xenogamy
2) Geitonogamy
3) Chasmogamy
4) Cleistogamy

Ans. 1

113. Which of the following plants is monoecious?
1) Carica papaya
2) Chara
3) Marchantia polymorpha
4) Cyas circinalis

Ans. 2

114. Complete the flow chart on central dogma

(a) DNA $\xrightarrow{\text{(b)}}$ mRNA $\xrightarrow{\text{(c)}}$ (d)
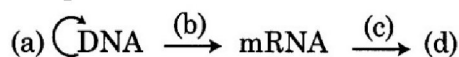
1) (a)-Replication; (b)-Transcription; (c)-Transduction; (d)-Protein
2) (a)-Translation; (b)-Replication (c)-Transcription; (d)-Transduction
3) (a)-Replication; (b)-Transcription (c)-Translation; (d)-Protein
4) (a)-Transduction; (b)-Translation (c)-Replication; (d)-Protein

Ans. 3

115. Match List-I with List-II

	List-I		List-II
(a)	Cristae	(i)	Primary constriction in chromosome
(b)	Thylnkoids	(ii)	Disc-shaped sacs in Golgi apparatus
(c)	Centromere	(iii)	Infoldings in mitochondria
(d)	Cisternae	(iv)	Flattened membranous sacs in stroma of plastids

Choose the correct answer from the options given below

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

Ans. 3

116. Mutations in plant cells can be induced by:
1) Kinetin
2) Infrared rays
3) Gamma rays
4) Zeatin

Ans. 3

117. Which of the following statements is not correct?
1) Pyramid of biomass in sea is generally inverted
2) Pyramid of biomass in sea is generally upright
3) Pyramid of energy is always upright
4) Pyramid of numbers in grassland ecosystem is upright

Ans. 2

118. Inspite of interspecific competition in nature, which mechanism the competing species might have evolved for their survival?
1) Resource partitioning
2) Competitive release
3) Mutualism
4) Predation

Ans. 1

119. Match List-I with List-II

	List-I		List-II
(a)	Cohesioin	(i)	More attraction in liquid phase
(b)	Adhesion	(ii)	Mutual attraction among water molecules
(c)	Surface tension	(iii)	Water loss in liquid phase
(d)	Guttation	(iv)	Attraction towards polar surfaces

Choose the correct answer from the options given below

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

Ans. 1

120. DNA standards on a gel stained with ethidium bromide when viewed under UV radiation, appear as:
1) Yellow bands   2) Bright orange bands
3) Dark red bands   4) Bright blue bands

Ans. 2

121. Which of the following is an incorrect statement?
1) Mature sieve tube elements possess a conspicuous nucleus and usual cytoplasmic organelles
2) Microbodies are present both in plant and animal cells
3) The perinuclear space forms a barrier between the materials present inside the nucleus and that of the cytoplasm
4) Nuclear pores act as passages for proteins and RNA molecules in both directions between nucleus and cytoplasm

Ans. 1

122. When gene targeting involving gene amplification is attempted in an individual's tissue to treat disease, it is known as:
1) Biopiracy   2) Gene therapy
3) Molecular diagnosis 4) Safety testing

Ans. 2

123. Match List-I with List-II

	List-I		List-II
(a)	Cells with active cell division capacity	(i)	Vascular tissues
(b)	Tissues having all cells similar in structure and function	(ii)	Meristematic tissue
(c)	Tissue having different types of cells	(iii)	Sclereids
(d)	Dead cells with highly thickened walls and narrow Lumen	(iv)	Simple tissue

Choose the correct answer from the options given below

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

Ans. 1

124. Which of the following is a correct sequence of steps in a PCR (Polymerase Chain Reaction)?
1) Denaturation, Annealing, Extension
2) Denaturation, Extension, Annealing
3) Extension, Denaturation, Annealing
4) Annealing, Denaturation, Extension

Ans. 1

125. Which of the following algae produce carrageen
1) Green algae   2) Brown algae
3) Red algae   4) Blue-green algae

Ans. 3

126. Which of the following is not an application of PCR (Polymerase Chain Reaction)
1) Molecular diagnosis
2) Gene amplification
3) Purification of isolated protein
4) Detection of gene mutation

Ans. 3

127. Genera like Selaginella and Salvinia produce two kinds of spores. Such plants are known as:
1) Homosorus   2) Heterosours
3) Homosporous   4) Heterosporous

Ans. 4

128. Diadelphous stamens are found in:
   1) China rose   2) Citrus
   3) Pea   4) China rose and citrus

Ans. 3

129. When the centromere is situated in the middle of two equal arms of chromosomes, the chromosome is referred as:
   1) Metacentric   2) Telocentric
   3) Sub-metacentric   4) Acrocentric

Ans. 1

130. Which of the following algae contains mannitol as reserve food material?
   1) Ectocarpus   2) Gracilaria
   3) Voluox   4) Ulothrix

Ans. 1

131. The amount of nutrients, such as carbon, nitrogen, phosphorus and calcium present in the soil at any given time, is referred as:
   1) Climax   2) Climax community
   3) Standing state   4) Standing crop

Ans. 3

132. The first stable product of CO_2 fixation in sorghum is:
   1) Pyruvic acid   2) Oxaloacetic acid
   3) succinic acid   4) Phosphoglyceric acid

Ans. 2

133. The site of perception of light in plants during photoperiodism is:
   1) Shoot apex   2) Stem
   3) Axillary bud   4) Leaf

Ans. 4

134. The plant hormone used to destroy weeds in field is
   1) IAA   2) NAA   3) 2, 4-D   4) IBA

Ans. 3

135. The production of gametes by the parents, formation of zygotes, the F_1 and F_2 plants can be understood from a diagram called:
   1) Bullet square   2) Punch square
   3) Punnett square   4) Net square

Ans. 3

BOTANY - SECTION – B

136. In the exponential growth equation $N_t = N_0 e^{rt}$.e represents:
   1) The base of number logarithms
   2) The base of exponential logarithms
   3) The base of natural logarithms
   4) The base of geometric logarithms

Ans. 3

137. Match List-I with List-II

	List-I		List-II
(a)	Nitrococcus	(i)	Denitrification
(b)	Rhizobium	(ii)	Conversion of ammonia to nitrite
(c)	Thiobacillus	(iii)	Conversion of nitrite to nitrate
(d)	Nitrobacter	(iv)	Conversion of atmospheric nitrogen to ammonia

Choose the correct answer from the options given below

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

Ans. 1

138. Match List-I with List-II

	List-I		List-II
(a)	S phase	(i)	Proteins are synthesized
(b)	G_2 phase	(ii)	Inactive phase
(c)	Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication
(d)	G_1 phase	(iv)	DNA replication

Choose the correct answer from the options given below

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

Ans. 3

139. Identify the correct statement
1) In capping, methyl guanosine triphosphate is added to the 3' end of hnRNA
2) RNA polymerase binds with Rho factor to terminate the process of transcription in bacteria
3) The coding strand in a transcription unit is copied to an mRNA
4) Split gene arrangement is characteristic of prokaryotes

Ans. 2

140. Plasmid pBR322 has PstI restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β-galactoside production and the recombinant plasmid is inserted in an E.coli strain
1) It will not be able to confer amplicillin resistance to the host cell
2) The transformed cells will have the ability to resist ampicillin as well as produce β-galactoside
3) It will lead to lysis of host cell
4) It will be able to produce a novel protein with dual ability

Ans. 1

141. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence, called as:
1) Satellite DNA   2) Repetitive DNA
3) Single nucleotides   4) Polymorphic DNA

Ans. 2

142. Which of the following statements is correct?
1) Fusion of two cells is called Karyogamy
2) Fusion of protoplasms between to motile on non-motile gamets is called plasmogamy
3) Organisms that depends on livng plants are called saprophytes
4) Some of the organisms can fix atmospheric nitrogen in specialized cells called sheath cells

Ans. 2

143. Match Column-I with Column-II

Column-I	Column-II
(a) $\%\oplus\updownarrow K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$	(i) Brassicaceae
(b) $\oplus\updownarrow K_{(5)}\overparen{C_{(5)}}A_5\underline{G}_2$	(ii) Liliaceae
(c) $\oplus\updownarrow \overparen{P_{(3+3)}}A_{3+3}\underline{G}_{(3)}$	(iii) Fabaceae
(d) $\oplus\updownarrow K_{2+2}C_4A_{2-4}\underline{G}_{(2)}$	(iv) Solanaceae

Select the correct answer from the options given below.

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

Ans. 1

144. Now a days it is possible to detect the mutated gene causing cancer by allowing radioactive probe to hybridise its complimentary DNA in a clone of cells. Followed by its detection using autoradiography because.
1) Mutated gene partially appears on a photographic film
2) Mutated gene completely and clearly appears on a photographic film
3) Mutated gene does not appear on a photographic film as the probe has no complimentarity with it
4) Mutated gene does not appear on photographic film as the probe has complimentarity with it

Ans. 3

145. Which of the flowing statements is incorrect?
1) Both ATP and NADPH+H$^+$ are synthesized during non-cyclic photophosphorylation
2) Stroma lamellae have PS I only and lack NADP reductase
3) Grana lamellae have both PS I only PS II
4) Cyclic photophosphorylation involves both PS I and PS II

Ans. 4

146. Which of the following statements is incorrect?

1) During aerobic respiration, role of oxygen is limited to the terminal stage

2) In ETC (Electron Transport Chain), one molecule of $NADH+H^+$ gives rise to 2ATP molecules, and one $FADH_2$ gives rise to 3 ATP molecules

3) ATP is synthesized through complex V

4) Oxidation-reduction reactions produce proton gradient in respiration

Ans. 2

147. Match List-I with List-II

	List-I		List-II
(a)	Protein	(i)	C=C double bonds
(b)	Unsaturated fatty acid	(ii)	Phosphodiester bonds
(c)	Nucleic acid	(iii)	Glycosidic bonds
(d)	Polysaccharide	(iv)	Peptide bonds

Choose the correct answer from the options given below

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

Ans. 1

148. What is the role of RNA polymerase III in the process of transcription in eukaryotes?

1) Transcribes rRNAs (28S, 18S and 5.8s)

2) Transcribes tRNA, 5s rRNA and snRNA

3) Transcribes precursor of mRNA

4) Transcribes only snRNAs

Ans. 2

149. Select the correct pair

1) Large colorless empty cells in the epidermis of grass leaves	Subsidary cells
2) In dicot leaves, vascular – bundles are surrounded by large thick-walled cells	Conjunctive tissue
3) Cells of medullary rays that form part of cambial ring	Interfascicular cambium
4) Loose parenchyma cells Rupturing the epidermis and forming a lens-shaped opening in bark	Spongy parenchyma

Ans. 3

150. In some members of which of the following pairs of families, pollen grains retain their viability for months after release?

1) Poaceae; Rosaceae

2) Poaceae; Leguminosae

3) Poaceae; Solanaceae

4) Rosacea; Leguminosae

Ans. 4

ZOOLOGY - SECTION - A

151. Match List-I with List-II

List-I	List-II
(a) Vaults	(i) Entry of sperm through Cervix is blocked
(b) IUDs	(ii) Removal of Vas deferens
(c) Vasectomy	(iii) Phagocytosis of sperms within the Uterus
(d) Tubectomy	(iv) Removal of fallopian tube

Choose the correct answer form the option given below

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

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

Ans. 2

152. Which of the following statements wrongly represents the nature of smooth muscle?

1) These muscle have no striations

2) They are involuntary muscles

3) Communication among the cells is performed by intercalated discs

4) These muscles are present in the wall of blood vessels

Ans. 3

153. The organelles that are included in the endomembrane system are
1) Endoplasmic reticulum, Mitochondria, Ribosomes and Lysosomes
2) Endoplasmic reticulum, Golgi complex, Lysosomes and Vacuoles
3) Golgi complex, Mitochondria, Ribosomes and Lysosomes
4) Golgi complex, Endoplasmic reticulum, Mitochondria and Lysosomes

Ans. 2

154. Succus entericus is referred to as
1) Pancreatic juice   2) Intestinal juice
3) Gastric juice   4) Chyme

Ans. 2

155. Which one of the following is an example of Hormone releasing IUD?
1) CuT   2) LNG 20
3) Cu 7   4) Multiload 375

Ans. 2

156. Which one of the following belongs to the family Muscidae?
1) Fire fly   2) Grasshopper
3) Cockroach   4) House fly

Ans. 4

157. If Adenine makes 30% of the DNA molecule, what will be the percentage of Thymine, Guanine and Cytosine in it?
1) T:20; G:30; C:20   2) T:20; G:20; C:30
3) T:30; G:20; C:20   4) T:20; G:25; C:25

Ans. 3

158. Receptors of sperm binding in mammals are present on
1) Corona radiata   2) Vitelline membrane
3) Perivitelline space   4) Zona pellucida

Ans. 4

159. Which of the following is not an objective of Biofortification in crops?
1) Improve protein content
2) Improve resistance to diseases
3) Improve vitamin content
4) Improve micronutrient and mineral content

Ans. 2

160. The centriole undergoes duplication during
1) S-phase   2) Prophase
3) Metaphase   4) G_2 phase

Ans. 1

161. Chronic auto immune disorder affecting neuro muscular junction leading to fatigue, weakening and paralysis of skeletal muscle is called as
1) Arthritis   2) Muscular dystrophy
3) Myasthenia gravis   4) Gout

Ans. 3

162. Match List-I with List-II

List-I	List-II
(a) Metamerism	(i) Coelenterata
(b) Canal system	(ii) Ctenophora
(c) Comb plates	(iii) annelida
(d) Cnidoblasts	(iv) Porifera

Choose the correct answer form the option given below
1) a-iv, b-iii, c-i, d-ii   2) a-iii, b-iv, c-i, d-ii
3) a-iii, b-iv, c-ii, d-i   4) a-iv, b-i, c-ii, d-iii

Ans. 3

163. During the process of gene amplification using PCR, if very high temperature is not maintained in the beginning, then which of the following steps of PCR will be affected first?
1) Annealing   2) Extension
3) Denaturation   4) Ligation

Ans. 3

164. Read the following statements
(a) Metagenesis is observed in Helminths
(b) Echinoderms are triploblastic and coelomate animals
(c) Round worms have organ-system level of body organization
(d) Comb plates present in ctenophores help in digestion
(e) Water vascular system is characteristic of Echinoderms
Choose the correct answer form the option given below
1) c, d and e are correct
2) a, b and c are correct
3) a, d and e are correct
4) b, c and e are correct

Ans. 4

165. Dobson units are used measure thickness of
1) CFCs
2) Stratosphere
3) Ozone
4) Troposphere
Ans. 3

166. Which is the 'Only enzyme" that has "Capability" to a catalyse Initiation. Elongation and Termination the process of transcription in prokaryotes?
1) DNA dependent DNA polymerase
2) DNA dependent RNA polymerase
3) DNA ligase
4) DNase
Ans. 2

167. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DN is
1) Degenerate primer sequence
2) Okazaki sequences
3) Palindromic Nucleotide sequences
4) Poly (A) tail sequences
Ans. 3

168. The fruit fly has 8 chromosome (2n) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase?
1) 8
2) 16
3) 4
4) 32
Ans. 1

169. Sphincter of oddi is present at
1) Ileo-caecal junction
2) Junction of hepato-pancreatic duct and duodenum
3) Gastro-oesophageal junction
4) Junction of jejunum and duodenum
Ans. 2

170. Math List-I with List-II

List-I	List-II
(a) Aspergillus niger	(i) Acetic Acid
(b) Acetobacter aceti	(ii) Lactic Acid
(c) Clostridium butylicum	(iii) Citric Acid
(d) Lacto bacillus	(iv) Butyric Acid

Choose the correct answer form the option given below
1) a-iii, b-i, c-iv, d-ii
2) a-i, b-ii, c-iii, d-iv
3) a-ii, b-iii, c-i, d-iv
4) a-iv, b-ii, c-i, d-iii
Ans. 1

171. Which one of the following organisms bears hallow and pneumatic long bones?
1) Neophron
2) Hemidactylus
3) Macropus
4) Ornithorhynchus
Ans. 1

172. In a cross between a male and female, both heterozygous for sickle cell anaemia gene, what percentage of the progeny will be diseased?
1) 50%
2) 75%
3) 25%
4) 100%
Ans. 3

173. The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are
1) $pO_2=104$ and $pCO_2=40$
2) $pO_2=40$ and $pCO_2=45$
3) $pO_2=95$ and $pCO_2=40$
4) $pO_2=159$ and $pCO_2=0.3$
Ans. 1

174. Veneral diseases can spread through
(a) Using sterile needles
(b) Transfusion of blood from infected person
(c) Infected mother to foetus
(d) Kissing
(e) Inheritance
Choose the correct answer form the option given below
1) a, b and c only
2) b, c and d only
3) b and c only
4) a and c only
Ans. 3

175. Which of the following RNAs is not required for the synthesis of protein?
1) mRNA
2) tRNA
3) rRNA
4) siRNA
Ans. 4

176. Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli
1) High pO_2, low pCO_2, less H^+, lower temperature
2) Low pO_2, high pCO_2, more H^+, higher temperature
3) High pO_2, high pCO_2, less H^+, higher temperature
4) Low pO_2, low pCO_2, more H^+, high temperature
Ans. 1

177. Match the following

List-I	List-II
(a) Physalia	(i) Pearly oyster
(b) Limulus	(ii) Portuguese Man of War
(c) Ancylostoma	(iii) Living fossil
(d) Pinctada	(iv) Hook worm

Choose the correct answer form the option given below

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

Ans. 3

178. Which enzyme is responsible for the conversion of inactive fibrinogens to fibrins?

1) Thrombin   2) Renin
3) Epinephrine   4) Thrombokinase

Ans. 1

179. For effective treatment of the disease, early diagnosis and understanding its pathophysiology is very important. Which of the following molecular diagnostic techniques is very useful for early detection?

1) Western Blotting Technique
2) Southern Blotting Technique
3) ELISA Technique
4) Hybridization Technique

Ans. 3

180. Identify the incorrect pair

1) Alkaloids - Codeine
2) Toxin – Abrin
3) Lectins – Concanavalin A
4) Drugs – Ricin

Ans. 4

181. Which stage of meiotic prophase shows terminalisation of chiasmata as its distinctive feature?

1) Leptotene   2) Zygotene
3) Diakinesis   4) Pachytene

Ans. 3

182. With regard to insulin choose correct options
(a) C-peptide is not present in mature insulin
(b) The insulin produced by rDNA technology has C-peptide
(c) The pro-insulin has C-peptide
(d) A-peptide and B-peptide of insulin are interconnected by disulphide bridges
Choose the correct answer from the options given below

1) b and d only   2) b and c only
3) a, c and d only   4) a and d only

Ans. 3

183. Person with 'AB' blood group are called "Universal recipients". This is due to
1) Absence of antigens A and B on the surface of RBCs
2) Absences of antigens A and B in plasma
3) Presence of antibodies, anti-A and anti-B, on RBCs
4) Absence of antibodies, anti-A and anti-B in plasma

Ans. 4

184. Erythropoietin hormone which stimulates R.B.C formation is produced by
1) Alpha cells of pancreas
2) The cells of rostral adenohypophysis
3) The cells of bone marrow
4) Juxtaglomerular cells of the kidney

Ans. 4

185. Which of the following characteristic is incorrect with respect to cockroach?
1) A ring of gastric caeca is present at the junction of midgut and hind gut
2) Hypopharynx lies within the cavity enclosed by the mouth parts
3) In females, 7th -9th sterna together form a genital pouch
4) 10th abdominal segment in both sexes, bears a pair of anal cerci

Ans. 1

ZOOLOGY – SECTION

186. The adenosine deaminase deficiency results into
1) Dysfunction of immune system
2) Parkinson's disease
3) Digestive disorder
4) Addison's disease

Ans. 1

187. Which of the following is not a step in Multiple Ovulation Embryo Transfer Technology (MOET)?
1) Cow is administered hormone having LH like activity for super ovulation
2) Cow yields about 6-8 eggs at a time
3) Cow is fertilized by artificial insemination
4) Fertilized eggs are transferred to surrogate mother at 8-32 cell stage

Ans. 1

188. Math List-I with List-II

List-I	List-II
(a) Adaptive radiation	(i) Selection of resistant varieties due to excessive use of herbicides and pesticides
(b) Convergent evolution	(ii) Bones of forelimbs in Man and Whale
(c) Divergent evolution	(iii) Wings of Butterfly and Bird
(d) Evolution by anthropogenic action	(iv) Darwin Finches

Choose the correct answer form the options given below
1) a-iv, b-iii, c-ii, d-i
2) a-iii, b-ii, c-i, d-iv
3) a-ii, b-i, c-iv, d-iii
4) a-i, b-iv, c-iii, d-ii

Ans. 1

189. Which one of the following statements about Histones is wrong?
1) Histones are organized to form a unit of 8 molecules
2) The pH of histones is slightly acidic
3) Histones are rich in amino acids – Lysine and Arginine
4) Histones carry positive charge in the side chain

Ans. 2

190. Which of the following secretes the hormone, relaxin, during the later phase of pregnancy?
1) Graffian follicle
2) Corpus luteum
3) Foetus
4) Uterus

Ans. 2

191. Following are the statements with reference to 'lipids'
(a) Lipids having only single bonds are called unsaturated fatty acids
(b) Lecithin is a phospholipid
(c) Trihydroxy propane is glycerol
(d) Palmitic acid has 20 carbon atoms includes carboxyl carbon
(e) Arachidonic acid has 16 carbon atoms
Choose the correct answer from the options given below
1) a and b only
2) c and d only
3) b and c only
4) b and e only

Ans. 3

192. Match List-I with List-II

List-I	List-II
(a) Filariasis	(i) Haemophilus influenza
(b) Amoebiasis	(ii) Trichophyton
(c) Pneumonia	(iii) Wuchereria bancrofti
(d) Ringworm	(iv) Entamoeba histolytica

Choose the correct answer from the options given below
1) a-iv, b-i, c-iii, d-ii
2) a-iii, b-iv, c-i, d-ii
3) a-i, b-ii, c-iv, d-iii
4) a-ii, b-iii, c-i, d-iv

Ans. 2

193. Identify the types of cell junctions that help to strong the leakage of the substance across a tissues and facilitation of communication with neighbouring cells via rapid transfer of ions and molecules.
1) Gap junctions and Adhering junctions respectively
2) Tight junctions and Gap junctions respectively
3) Adhering junctions and Tight junctions respectively
4) Adhering junctions and Gap junctions respectively

Ans. 2

194. During muscular contraction which of the following events occur?
    (a) 'H' zone disappears
    (b) 'A' band widens
    (c) 'I' band reduces in width
    (d) Myosine hydrolyzes ATP, releasing the ADP and Pi
    (e) Z-lines attached to actins are pulled inwards.
    Choose the correct answer from the options given below
    1) a, c, d, e only   2) a, b, c, d only
    3) b, c, d, e only   4) b, d, e a, only

Ans. 1

195. Following are the statements about prostomium of earthworm
    (a) It serves as a covering for mouth
    (b) It helps to open cracks in the soil into which it can crawl
    (c) It is one of the sensory structures
    (d) it is the first body segment
    Choose the correct answer from the options given below
    1) a, b, and c are correct
    2) a, b and d are correct
    3) a, b, c and d are correct
    4) b and c are correct

Ans. 1

196. Assertion (A): A person goes to high altitude and experiences 'altitude sickness' with symptoms like breathing difficulty and heart palpitations
    Reason (R): Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.
    In the light of the above statements, choose the correct answer from the options given below
    1) Both A and R are true and R is the correct explanation of A
    2) Both A and R are true but R is not the correct explanation of A
    3) A is true but R is false
    4) A is false but R is true

Ans. 1

197. Which of these is not an important component of initiation of parturition in humans?
    1) Increase in estrogen and progesterone ratio
    2) Synthesis of prostaglandins
    3) Release of Oxytocin
    4) Release of Prolactin

Ans. 4

198. Match List-I with List-II

List-I	List-II
(a) Allen's Rule	(i) Kangaroo rat
(b) Physiological adaptation	(ii) Desert lizard
(c) Behavioural adaptation	(iii) Marine fish at depth
(d) Biochemical adaptation	(iv) Polar seal

Choose the correct answer from the options given below
1) a-iv, b-ii, c-iii, d-i   2) a-iv, b-i, c-iii, d-ii
3) a-iv, b-i, c-ii, d-iii   4) a-iv, b-iii, c-ii, d-i

Ans. 3

199. Match List-I with List-II

List-I	List-II
(a) Scapula	(i) Cartilaginous joints
(b) Cranium	(ii) Flat bone
(c) Sternum	(iii) Fibrous joints
(d) Vertebral column	(iv) Triangular flat bone

Choose the correct answer from the options given below
1) a-i, b-iii, c-ii, d-iv   2) a-ii, b-iii, c-iv, d-i
3) a-iv, b-ii, c-iii, d-i   4) a-iv, b-iii, c-ii, d-i

Ans. 4

200. Statement-I: The codon 'AUG' codes for methionine and phenylalanine
    Statement-II: 'AAA' and 'AAG' both codons code for the amino acid lysine
    In the light of the above statements, Choose the correct answer from the options given below
    1) Both Statement I and Statement II are true
    2) Both Statement I and Statement II are false
    3) Statement I is correct but Statement II is false
    4) Statement I is incorrect but Statement II is true

Ans. 4