FT - 11 (FR) (NEET - CBSE, GSEB) (13 - 06 - 2026)

ANSWER KEY

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

PHYSICS:

1. **Sol. (1)**

Initially speed is zero, then increases & after some time it becomes constant.

2. **Sol. (3)**

$$s_n = u + \frac{1}{2}a(2n-1)$$

Here, u = 0, $a = \frac{4}{3}$

$\therefore \quad s_3 = 0 + \frac{1}{2} \times \frac{4}{3} \times (6-1) = \frac{10}{3}\,\text{m}$

3. **Sol. (2)**

Second law of motion gives us a measure of force. Magnitude of force can be calculated by multiplying mass of the body and the acceleration produced in it.

or F = ma

Here, F = 10 N

a = 1 m/s²

$\therefore \quad m = \frac{F}{a} = \frac{10}{1} = 10\,\text{kg}$

4. **Sol. (1)**

$$\tan\varphi = \frac{X_L}{R} = \frac{L\omega}{R}$$

$$\tan\varphi = \frac{3\Omega}{3\Omega}$$

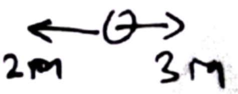
$$\tan\varphi = 1$$

$$\varphi = \tan^{-1}(1)$$

$$\varphi = 45^\circ$$

$$\varphi = \frac{\pi}{4}\ \text{rad}.$$

5. **Sol. (4)**



Momentum is conserve

$\therefore$ $|p_1| = |p_2|$ & k.E = $\frac{p^2}{2m}$

$\therefore \quad \frac{k_1}{k_2} = \frac{3}{2}$

k.E $\propto \frac{1}{m}$ & $k_1 + k_2 = E$

∴ $K_1 = \frac{3}{5}E$

6. **Sol. (2)**

Applying conservation of linear momentum, we write, $m_1u_1 = m_2u_2$

Here, $m_1 = 18$ kg, $m_2 = 12$ kg

$u_1 = 6\ ms^{-1}$, $u_2 = ?$

∴ $18 \times 6 = 12u_2$

⇒ $u_2 = \frac{18\times 6}{12} = 9\ ms^{-1}$

Thus, kinetic energy of 12 kg mass

$$K_2 = \frac{1}{2}m_2u_2^2$$

$$= \frac{1}{2} \times 12 \times (9)^2 = 6 \times 81 = 486 \text{ J}$$

7. **Sol. (2)**

This expression for speed of light and the dimensions of speed of light are $[LT^{-1}]$.

8. **Sol. (2)**

The system of two given particles of masses m_1 and m_2 are shown in figure.

Initially the centre of mass

$$r_{CM} = \frac{m_1r_1 + m_2r_2}{m_1 + m_2} \quad \text{… (i)}$$

When mass m_1 moves towards centre of mass by a distance d, then let mass m_2 moves a distance d' away from CM to keep the CM in its initial position.

So, $r_{CM} = \frac{m_1(r_1 - d) + m_2(r_2 + d')}{m_1 + m_2}$ … (ii)

Equating Eqs. (i) and (ii), we get

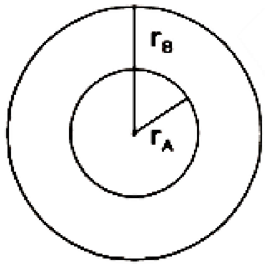
$$\frac{m_1r_1 + m_2r_2}{m_1 + m_2} = \frac{m_1(r_1 - d) + m_2(r_2 + d')}{m_1 + m_2}$$

⇒ $-m_1d + m_2d' = 0$

⇒ $d' = \frac{m_1}{m_2}d$

➔ **If both the masses are equal i.e., $m_1 = m_2$, then second mass will move a distance equal to the distance at which first mass is being displaced.**

9. **Sol. (3)**



$T_A = T_B = T$

$\omega_A = \frac{2\pi}{T_A}$

$\omega_B = \frac{2\pi}{T_B}$

$\frac{\omega_A}{\omega_B} = \frac{T_B}{T_A} = \frac{T}{T} = 1$

10. **Sol. (1)**

motion of e^- is st. line

∴ $F_{Total} = 0$

∴ $|F_m| = |F_e| \Rightarrow VB = E$

$\frac{l}{t}B = E$

$t = \frac{lB}{E} = \frac{lB\varepsilon_o}{\sigma}$

$\left[\because E = \frac{\sigma}{\varepsilon_0}\right]$

11. **Sol. (2)**

12. **Sol. (3)**

$\bar{r} = \cos\omega t\,\hat{x} + \sin\omega t\,\hat{y}$

$\bar{v} = (-\sin\omega t\,\hat{x} + \cos\omega t\,\hat{y})\,\omega$

$\bar{r}\cdot\bar{v} = 0$

∴ $\bar{r} \perp \bar{v}$ &

$\bar{a} = -\omega^2\,\bar{r}$

∴ Acceleration is towards origin

13. **Sol. (4)**

Plane angle and solid angle are dimensionless but have units.

14. **Sol. (1)**

From first law of thermodynamics

$\Delta Q = \Delta U + \Delta W$

For adiabatic process $\Delta Q = 0$

$\Delta U = -\Delta W$.

15. **Sol. (1)**

Pressure exerted by gas molecules is

$$p = \frac{1}{3}\rho\bar{v}^2 \qquad \ldots(i)$$

or $\quad p = \frac{2}{3}n \cdot \frac{1}{2}m\bar{v}^2 \qquad (\because \rho = mn)$

Now, $\frac{1}{2}m\bar{v}^2$ = average kinetic energy of a gas molecule $(\overline{KE})$

Therefore, $p = \frac{2}{3}n\,\overline{KE}$

If N is total number of gas molecules in volume V,

then $\quad n = \frac{N}{V}$

$\therefore \quad p = \frac{2}{3} \cdot \frac{N}{V}\left(\frac{1}{2}m\bar{v}^2\right)$

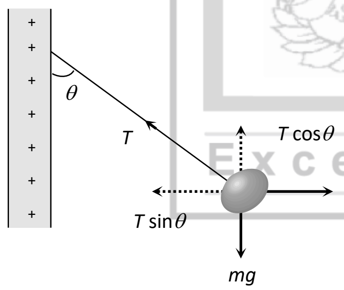
or $\quad pV = \frac{2}{3}N(\overline{KE})$

Also, from Eq. (i) $p = \frac{2}{3} \cdot \frac{1}{2}\rho\bar{v}^2$

Now, $\frac{1}{2}\rho\bar{v}^2$ = average kinetic energy of the gas per unit volume.

Therefore, $\quad p = \frac{2}{3}E$

16. Sol. (2)



$T\sin\theta = qE$ and $T\cos\theta = mg$

$\Rightarrow \quad \tan\theta = \frac{qE}{mg} = \frac{q}{mg}\left(\frac{\sigma}{2\varepsilon_0}\right)$

$\Rightarrow \quad \sigma \propto \tan\theta$

17. Sol. (1)

Electric potential due to a charged sphere = $\frac{kQ}{R}$

$k = 9 \times 10^9$ N–m^2/C^2

Q : charge on sphere

R : Radius of sphere

Let charge and radius of smaller drop is q and r respectively

For smaller drop, $V = \frac{kq}{r} = 220V$

Let R be radius of bigger drop,

As volume remains the same

$$\left(\frac{4}{3}\pi r^3\right) \times 27 = \frac{4}{3}\pi R^3$$

$$\Rightarrow R = \sqrt[3]{27}r = 3r$$

Now, using charge conservation,

$$\Rightarrow Q = 27q$$

$$V_{\text{big drop}} = \frac{kQ}{R} = \frac{k(27q)}{3r} = 9\left(\frac{kq}{r}\right)$$

= 9 × 220 = 1980 V

18. Sol. (1)

$$g_{in} = g_o \frac{r}{R}$$

g_o is 'g' at surface.

19. Sol. (1)

Power of electric bulb

$$P = \frac{V^2}{R}$$

So, resistance of electric bulb

$$R = \frac{V^2}{P}$$

Given, P_1 = 25 W, P_2 = 100 W, $V_1 = V_2$ = 220 volt

Therefore, for same potential difference V,

$$R \propto \frac{1}{P}$$

Thus, we observe that for minimum power, resistance will be maximum and vice-versa.

Hence, resistance of 25 W bulb is maximum and 100 W bulb is minimum.

20. Sol. (2)

$$\vec{F} = I(\vec{\ell} \times \vec{B})$$

$$= I\left[\left(L\hat{i}\right) \times \left(2\hat{i} + 3\hat{j} - 4\hat{k}\right)\right]$$

$$= I\left(4L\hat{j} + 3L\hat{k}\right)$$

$$|\vec{F}| = 5\,IL$$

21. Sol. (1)

The magnetic field (2) at the centre of circular current carrying coil of radius R and current I,

$B = \frac{\mu_0 I}{2R}$.

Similarly, if current = 2 I, then

Magnetic field = $\frac{\mu_0 2I}{2R}$ = 2 B

So, resultant magnetic field

$$= \sqrt{B^2 + (2B)^2} = \sqrt{5B^2} = \sqrt{5}B = \frac{\mu_0 I\sqrt{5}}{2R}.$$

22. **Sol. (3)**

When a bar magnet is placed in an external magnetic field $\vec{B}$, a magnetic torque $\vec{\tau}$ acts on it, which is given by $\vec{\tau} = \vec{M} \times \vec{B}$.

23. **Sol. (1)**

During melting temperature of substance remains constant.

24. **Sol. (4)**

Root mean square value of an alternating current is defined as the square root of the average of i^2, during a complete cycle it may be taken by

$$\overline{i^2} = \frac{\int_0^{2\pi/\omega} i^2\, dt}{\frac{2\pi}{\omega}}$$

$$= \frac{\int_0^{2\pi/\omega} i^2 \sin^2\omega t\, dt}{\frac{2\pi}{\omega}}$$

$$= \frac{i_0^2\omega}{2\pi}\int_0^{2\pi/\omega} \frac{1}{2}(1-\cos 2\omega t)\,dt$$

$$= \frac{i_0^2\omega}{4\pi}\left[t - \frac{\sin 2\omega t}{2\omega}\right]_0^{2\pi/\omega}$$

$$= \frac{i_0^2\omega}{4\pi}\left(\frac{2\pi}{\omega}\right) = \frac{i_0^2}{2}$$

Given, $i_{rms} = \sqrt{\overline{i^2}} = \frac{i_0}{\sqrt{2}}$

25. **Sol. (4)**

It is given that, acceleration due to gravity on planet A is 9 times the acceleration due to gravity on planet B i.e.,

$g_A = 9g_B$ …(i)

From third equation of motion

$v^2 = 2gh$

At planet A, $h_A = \frac{v^2}{2g_A}$ … (ii)

At planet B, $h_B = \frac{v^2}{2g_B}$ … (iii)

Dividing Eq. (ii) by Eq. (iii), we have

$$\frac{h_A}{h_B} = \frac{g_B}{g_A}$$

From Eq. (i), $g_A = 9g_B$

$\therefore$ $\frac{h_A}{h_B} = \frac{g_B}{9g_B} = \frac{1}{9}$

Or $h_B = 9h_A = 9 \times 2 = 18$ m($\because h_A = 2$m)

26. **Sol. (3)**

$\vec{E} \times \vec{B} = \vec{V}$

$(E\hat{j}) \times (\vec{B}) = V\hat{i}$

So, $\vec{B} = B\hat{k}$

Direction of propagation is along +z direction.

27. **Sol. (4)**

Here, total thickness = t, Refractive index = μ

Speed of light in glass plate = $\frac{c}{\mu}$

$\left[\because v = \frac{\text{speed of light in vacuum}}{\text{refractive inex of medium}}\right]$

$\therefore$ Time taken by light to travel this thickness of glass

$$= \frac{t}{\left(\frac{c}{\mu}\right)} = \frac{\mu t}{c}$$

28. **Sol. (4)**

From lens maker's formula

$$\frac{1}{f} = (\mu_g - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) \quad ….(i)$$

When convex lens is dipped in a liquid of refractive index (μ_l), then its focal length

$$\frac{1}{f_l} = \left(\frac{\mu_g}{\mu_l} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

or $$\frac{1}{f_l} = \frac{\mu_g - \mu_l}{\mu_l}\left(\frac{1}{R_1} - \frac{1}{R_2}\right) \quad …(ii)$$

Dividing Eq. (i) by Eq. (ii), we get

$$\frac{f_l}{f} = \frac{(\mu_g - 1)\mu_l}{(\mu_g - \mu_l)} \quad …(iii)$$

But it is given that refractive index of lens is equal to refractive index of liquid i.e., $\mu_g = \mu_l$.

Hence, Eq. (iii) gives,

$$\frac{f_1}{f} = \frac{(\mu_g - 1)\mu_1}{0} = \infty \qquad \text{(infinity)}$$

29. **Sol. (2)**

Length of conductor (l) = 0.4 m

Speed = 7 m/s

Magnetic field B = 0.9 Wb/m^2

Induced emf, e = Blv sin θ

= 0.9 × 0.4 × 7 × sin 90°

= 2.52 V

30. **Sol. (4)**

Longest Wave length in UV [n = 2 → n = 1]

$$\frac{1}{\lambda_0} = R\left[\frac{1}{1^2} - \frac{1}{2^2}\right] \quad \text{..... (i)}$$

Shortest wave length in Infrared, [n → ∞ → n = 3]

$$\frac{1}{\lambda} = R\left[\frac{1}{3^2} - \frac{1}{\infty^2}\right] \quad \text{..... (ii)}$$

[n → ∞ → n = 3]

31. **Sol. (3)**

Nuclear radius r ∝ $A^{1/3}$, where A is mass number

$r = r_0 A^{1/3}$

$r = r_0 (27)^{1/3} = 3r_0$

$$r_0 = \frac{3.6}{3} = 1.2\,\text{fm}$$

For ^{64}Cu

$r = r_0 A^{1/3}$

$= 1.2\text{ fm } (64)^{1/3}$

= 4.8 fm.

32. **Sol. (4)**

(1) In insulators energy gap is of the order of 5 to 10 eV and it is particularly impossible to impart this much amount of energy to the electrons in valence band.

So, as to jump to conduction band.

So, choice (1) is correct.

(2) In semiconductors with the rise in temperature more electrons from valence band jump to conduction band and this results in increase in conductivity. So, choice (2) is correct.

(3) In conductors, the conduction band is either partially filled or the conduction band overlaps on the valence band, So, choice (3) is correct

(4) In semiconductor, resistivity, decreases with increase in temperature.

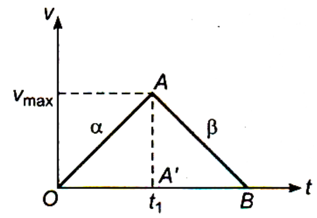
So, choice (4) is wrong.

33. **Sol. (3)**

The n-type semi-conductor can be produced by doping an impurity atom of valence 5 i.e. pentavalent atoms. i.e. phosphorus.

34. **Sol. (4)**

The situation is plotted on (v-t) graph. In (v-t) graph OA represents the accelerated part and AB represents the decelerated part.



Let t_1 and t_2 be the times for part OA and AB respectively.

At point A velocity is maximum and let it be v_{max}.

∴ $AA' = v_{max} = \alpha t_1 = \beta t_2$

But $t = t_1 + t_2 = \dfrac{v_{max}}{\alpha} + \dfrac{v_{max}}{\beta}$

$$= v_{max}\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$$

$$= v_{max}\left(\frac{\alpha + \beta}{\alpha\beta}\right)$$

or $$v_{max} = t\left(\frac{\alpha\beta}{\alpha + \beta}\right)$$

Alternative This problem can also be solved by checking the dimensions on both sides. On checking the dimensions we note that the dimension of (4) match with that of velocity.

35. **Sol. (3)**

Thrust on the rocket is the force with which the rocket moves upwards.

Thrust on the rocket at time t is given by

$$F = -u\frac{dm}{dt}$$

Where u is relative velocity of exhaust gases with respect to the rocket.

$\dfrac{dm}{dt}$ is rate of combustion of fuel at that instant.

$$\therefore\ F = -u\frac{dm}{dt} = mg$$

$$\Rightarrow\ -\frac{dm}{dt} = \frac{mg}{u}$$

Here, m = 600 kg, u = 1000 ms^{-1}

$$\therefore \quad -\frac{dm}{dt} = \frac{600\times 10}{1000} = 6 \text{ kg s}^{-1}$$

36. Sol. (3)

Energy stored per unit volume

$$= \frac{1}{2} \times stress \times strain$$

$$= \frac{1}{2} \times stress \times (stress / Young's\ modulus)$$

$$= \frac{1}{2} \times (stress)^2 / (Young's\ modulus) = \frac{S^2}{2Y}$$

37. Sol. (4)

Heat lost by steam = Heat gained by water

Let m' amount of heat converts into water.

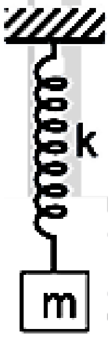
m' × L = ms Δt

m′ × 540 = 20 × 1 × (80 – 10)

m′ = $\frac{20\times 70}{540} = 2.5\text{g}$

Now, net water = 20 + 2.5 = 22.5 g.

38. Sol. (3)



$$T = 2\pi\sqrt{\frac{m}{k}} = 3 \text{ sec}$$

$$T' = 2\pi\sqrt{\frac{m+1}{k}} = 5 \text{ sec}$$

Dividing & squaring $\left(\frac{m}{m+1}\right) = \left(\frac{3}{5}\right)^2 = \frac{9}{25}$

25 = 9m + 9 so, $m = \frac{9}{16}$ kg

39. Sol. (1)

$$h = \frac{1eE}{2m}t^2$$

$$\therefore t = \sqrt{\frac{2hm}{eE}}$$

$\therefore t \propto \sqrt{m}$ as ‘e’ is same for electron and proton.

$\because$ Electron has smaller mass so it will take smaller time.

40. Sol. (1)

Capacitance of capacitor C = 20 μF

= 20 × 10^{-6} F

Rate of change of potential $\left(\frac{dV}{dt}\right) = 3$ v/s

q = CV

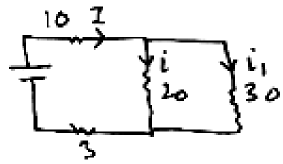
$$\frac{dq}{dt} = C\frac{dV}{dt}$$

i_c = 20 × 10^{-6} × 3

= 60 × 10^{-6} A = 60 μA

As we know that $i_d = i_c$ = 60 μA

41. Sol. (1)



Total Resistance = 25

$$I = \frac{10}{25} = \frac{2}{5}$$

20 I = 30 i_1

$$\frac{i}{i_1} = \frac{3}{2}$$

$$\therefore \quad i = \frac{3}{5}(I) = \frac{3}{5}\times\frac{2}{5} = \frac{6}{25} \text{ A}$$

42. Sol. (1)

ϕ = BA cos θ

$$= \frac{1}{\pi}\times\pi(0.2)^2 \cos 60°$$

= 0.02 Wb

43. Sol. (3)

Snell’s law in vector form is $\hat{i}\times\hat{n} = \mu(\hat{r}\times\hat{n})$

44. Sol. (2)

$$\frac{I_{max} - I_{min}}{I_{max} + I_{min}}$$

$$= \frac{\left(\sqrt{I_1}+\sqrt{I_2}\right)^2 - \left(\sqrt{I_1 - \sqrt{I_2}}\right)^2}{\left(\sqrt{I_1}+\sqrt{I_2}\right)^2 + \left(\sqrt{I_1 + \sqrt{I_2}}\right)^2}$$

$$= \frac{\left(\sqrt{\propto}+1\right)^2 - \left(\sqrt{\propto}-1\right)^2}{\left(\sqrt{\propto}+1\right)^2 + \left(\sqrt{\propto}-1\right)^2}$$

$$= \frac{4\sqrt{\propto}}{2(\propto+1)} = \frac{2\sqrt{\propto}}{\propto+1}$$

45. **Sol.(3)**

$k_{max} = h\nu - \phi$

$2eV = 5eV - \phi \Rightarrow \phi = 3eV$

So V_{st} = 3 volt

$V_{cathode} - V_{anode}$ = 3 volt

$V_{anode} - V_{cathode}$ = – 3 volt

CHEMISTRY:

46. **Sol. (2)**

47. **Sol. (3)**

Atoms consist of three fundamental particles:
Electrons, protons and neutrons

- The mass of the electron is 9.10939×10^{-31} kg
- All the isotopes of a given element show same chemical properties.
- Protons and neutrons present in the nucleus are collectively called as nucleons.
- Dalton's atomic theory, regarded the atom as the ultimate particle of matter

So, the correct statements are B, C, E only

48. **Sol. (3)**

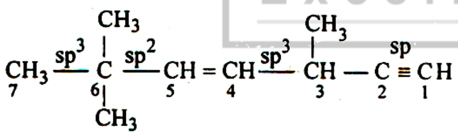
Compound	Oxidation number of nitrogen
N_2H_4	= – 2
NH_3	= – 3
N_3H	= – 1 / 3
NH_2OH	= – 1

49. **Sol. (2)**

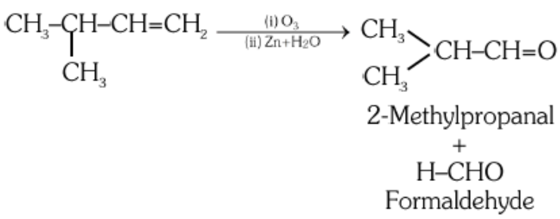
'B' has no vacant d-orbitals in its valence shell, so it can't extend its covalency beyond 4, i.e. 'B' cannot form the ion like $MF_6^{3(-)}$ i.e. $BF_6^{3(-)}$

Hence, the correct option is (2).

50. **Sol. (4)**



51. **Sol. (4)**



52. **Sol. (2)**

53. **Sol. (2)**

Sigma bond is stronger than π-bond. The electrons in the π bond are loosely held. The bond is easily broken and is more reactive than σ-bond. Energy released during sigma bond formation is always more than π bond because of greater extent of overlapping.

54. **Sol. (1)**

Free expansion ⇒ $P_{ex} = 0$

∴ $w = -P_{ex}\Delta V = 0$

∵ Adiabatic process ⇒ q = 0

also, ΔU = q + w [first law of thermodynamics]

∴ ΔU = 0

∵ Internal energy of an ideal gas is a function of temperature

∴ If internal energy remains constant

∴ ΔT = 0

55. **Sol. (2)**

$$K_c = K_p (RT)^{-\Delta n}$$

$$\frac{K_P}{K_c} = \frac{1}{(RT)^{-\Delta n}}$$

56. **Sol. (1)**

$$A_2(g) + B_2(g) \rightleftharpoons X_2(g); \Delta H = -\text{xkJ}$$

On increasing pressure equilibrium shifts in a direction where pressure decreases i.e. forward direction.

On decreasing temperature, equilibrium shifts in exothermic direction i.e., forward direction. So, high pressure and low temperature favours maximum formation of product.

57. **Sol. (2)**

Lewis acids are the one which accepts lone pair of electron due to presence of vacant orbital in outermost shell.

$H_2\ddot{O}:$ ⟶ Lewis base

BF_3 ⟶ Lewis acid

$:\ddot{O}H$ ⟶ Lewis base

$\ddot{N}H_3$ ⟶ Lewis base

58. **Sol. (3)**

$FeCl_2$ and $SnCl_2$ (both are reducing agent and have lower oxidation no.)

59. **Sol. (2)**

SO_3^{2-} → S is in +4 oxidation state

$S_2O_4^{2-}$ → S is in +3 oxidation state

$S_2O_6^{2-}$ → S is in +5 oxidation state

60. **Sol. (3)**

K_f does not depend on concentration of solution. It only depends on nature of solvent so it will be unchanged.

61. **Sol. (1)**

Option (ii) and (iv) are correct

∴ Correct choice: (1)

62. **Sol. (2)**

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

When concentration of A is tripled

$[A'] = [3A]$

New rate, $r' = k[A']^2[B] = k[3A]^2[B] = 9k[A]^2[B]$

$r' = 9r$

63. **Sol. (2)**

The stability of Cu^{2+} (aq) is more than Cu^{+} (aq) is due to the much more negative $\Delta_{hyd}H°$ of Cu^{2+} (aq) than Cu^{+} (aq), which more than compensates for second ionisation enthalpy of Cu.

$\Delta_{hyd}H°$ of Cu^{2+} (aq) = -2121 kJ mol^{-1}

$\Delta_i H_1^0$ of Cu = +745 kJ mol^{-1}

$\Delta_i H_2^0$ of Cu = +1960 kJ mol^{-1}

64. **Sol. (4)**

Oxidation state of Cr in CrO_4^{2-} and $Cr_2O_7^{2-}$ is +6.

65. **Sol. (4)**

- Complexes in which a metal is bound to only one kind of donor groups are called as homoleptic complexes
- Potassium trioxalatoaluminate (III)
  $K_3[Al(ox)_3]$
  It is a homoleptic complex

66. **Sol. (4)**

67. **Sol. (3)**

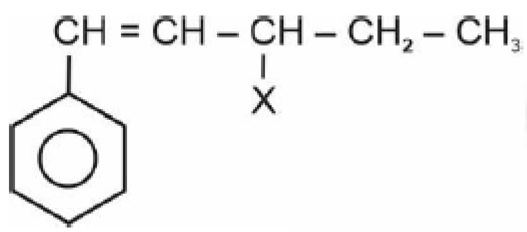
68. **Sol.(2)**

α-carbon is sp^3 carbon which is right next to

$>C = C<$

This α-position is known as allylic position

Hence,



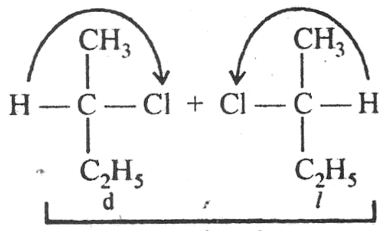
is allylic halide

69. **Sol. (4)**

Chlorination of n-butane taken place via free radical formation i.e.,

$Cl_2 \xrightarrow{hv} Cl° + Cl°$

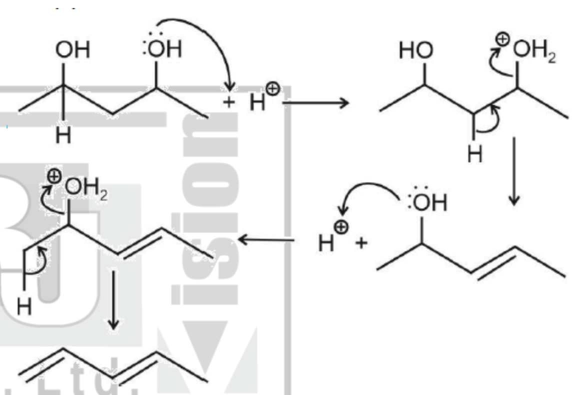
$CH_3 - CH_2 - CH_2 - CH_3 \xrightarrow{Cl_2/hv}$



Racemic mixture
50% d form + 50% *l* form

Cl° may attack on either side and give a racemic mixture of 2 chloro butane which contain 50% d form and 50% l-form.

70. **Sol. (1)**



71. **Sol. (4)**

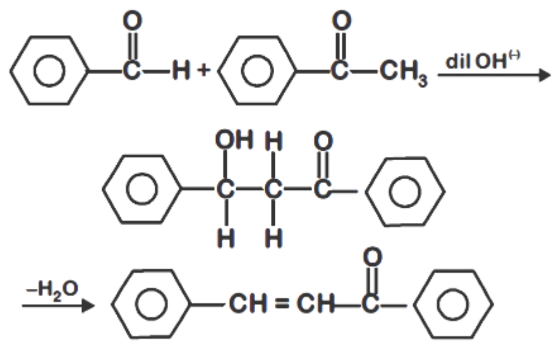
72. **Sol. (4)**

It is Reimer-Tiemann reaction. The electrophile formed is : CCl_2 (Dichlorocarbene) according to the following reaction

$$CHCl_3 + OH^- \rightleftharpoons \overset{\ominus}{C}Cl_3 + H_2O$$

$$\overset{\ominus}{C}Cl_3 \longrightarrow \underset{\text{Electrophile}}{:CCl_2} + Cl^-$$

73. **Sol. (4)**



In the presence of dil. $OH^{(-)}$, benzaldehyde and acetophenone will react to undergo cross-aldol condensation.

74. **Sol. (4)**

The cumulative effect of the contraction of the lanthanoid series, known as lanthanoid contraction, causes the radii of the members of the third transition series to be very similar to those of the corresponding members of the second series.

The almost identical radii of Zr (160 pm) and Hf (159 pm) is a consequence of the lanthanoid contraction.

75. **Sol. (1)**

76. **Sol. (2)**

Density = 1.17 gm/cc (Given)

As $d = \frac{\text{Mass}}{\text{Volume}}$

Volume = 1cc

$\therefore$ mass = d = 1.17 g

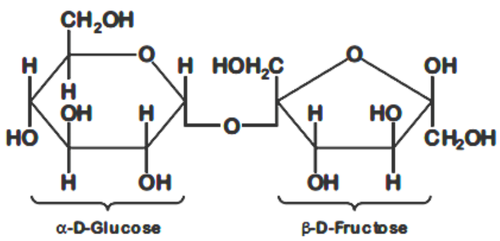
Now, molarity

$= \frac{\text{No. of moles}}{\text{Volume in litre}} = \frac{1.17 \times 1000}{36.5 \times 1} = \frac{1170}{36.5} = 32.05\text{M}$

77. **Sol. (1)**

78. **Sol. (3)**

$$\text{Sucrose} \xrightarrow{\text{Hydrolysis}} \alpha\text{-D-Glucose} + \beta\text{-D-Fructose}$$



79. **Sol.(2)**

80. **Sol.(4)**

H_2O (1.85 D) has higher dipole moment than H_2S (0.95 D)

81. **Sol.(3)**

82. **Sol.(2)**

Molecular weight of $C_{60}H_{122}$ = (12 × 60) + 122 = 842.

Therefore weight of one molecule

$= \frac{\text{Molecular weight of } C_{60}H_{122}}{\text{Avagadro's number}}$

$= \frac{842}{6.023 \times 10^{23}} = 1.4 \times 10^{-21}$ g

83. **Sol. (2)**

Energy of electromagnetic radiation (E)

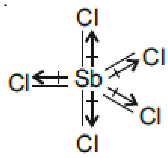
$= \frac{hc}{\lambda} = h\upsilon$

So, $\frac{c}{\lambda} = \upsilon \Rightarrow \frac{c}{\upsilon} = \lambda$

$\lambda = \frac{3 \times 10^8}{1368 \times 10^3} = 219.3\text{m}$

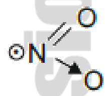
84. **Sol.(4)**

$SbCl_5$:



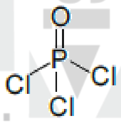
Net vector summation of bond moments will be zero so $SbCl_5$ is a non-polar molecule.

• NO_2 :



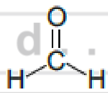
$\Rightarrow$ polar molecule.

• $POCl_3$:



$\Rightarrow$ polar molecule.

• CH_2O :



$\Rightarrow$ polar molecule.

85. **Sol. (1)**

In P-V graph area under the curve represent magnitude of work.

As it is maximum in graph-1

86. **Sol.(4)**

87. **Sol. (4)**

Alkane is produced by heating sodium salt of carboxylic acid with sodalime (NaOH and CaO in the ratio of 3: 1)

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

88. **Sol.(4)**

- (Hoffmann bromamide degradation reaction)

$$CH_3-CH_2-\overset{\overset{\large O}{\|}}{C}-NH_2 \xrightarrow[NaOH]{Br_2} CH_3-CH_2-NH_2$$

- (Carbylamine reaction)

$$CH_3-CH_2-NH_2 \xrightarrow[\Delta]{CHCl_3/KOH} CH_3CH_2NC$$

- (HVZ reaction)

$$CH_3CH_2COOH \xrightarrow[(ii)\,H_2O]{(i)\,Br_2/Red\,P} CH_3-\underset{\underset{\large Br}{|}}{CH}-COOH$$

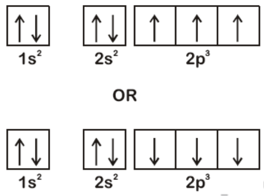
- (Clemmensen reduction)

$$CH_3-CH_2-\underset{\underset{\large O}{\|}}{C}-CH_3 \xrightarrow[HCl]{Zn-Hg} CH_3-CH_2-CH_2-CH_3$$

89. **Sol. (2)**

According to Hund's Rule of maximum multiplicity,

the correct electronic configuration of N-atom is



∴ Option (2) violates Hund's Rule.

90. **Sol.(3)**

Electromeric effect is a temporary effect.