Sample Paper-05 **Dropper NEET (2024)**

CHEMISTRY

ANSWER KEY

1.	(1)	26.	(1)
2.	(3)	27.	(1)
3.	(1)	28.	(2)
4.	(1)	29.	(4)
5.	(4)	30.	(1)
6.	(3)	31.	(3)
7.	(3)	32.	(1)
8.	(1)	33.	(2)
9.	(1)	34.	(2)
10.	(1)	35.	(1)
11.	(1)	36.	(4)
12.	(1)	37.	(4)
13.	(4)	38.	(3)
14.	(2)	39.	(3)
15.	(3)	40.	(4)
16.	(3)	41.	(1)
17.	(1)	42.	(3)
18.	(4)	43.	(4)
19.	(3)	44.	(4)
20.	(3)	45.	(3)
21.	(1)	46.	(3)
22.	(1)	47.	(1)
23.	(2)	48.	(3)
24.	(1)	49.	(4)
25.	(1)	50.	(4)

HINTS AND SOLUTION

1. (1)

Number of moles of Cl^- ions ionized from one mole of $CrCl_3.6H_2O$

$$= \frac{2.665}{266.5} = 0.01 \left[\begin{array}{l} \therefore \text{Molecular mass of} \\ CrCl_3.6H_2O = 266.5 \end{array} \right]$$

$\therefore$ Moles of AgCl obtained = Moles of Cl^- ionized

$$= \frac{2.87}{143.5} = 0.02$$

$\therefore$ 0.01 mole of complex $CrCl_3.6H_2O$ gives 0.02 mole of Cl^- on ionization.

Thus, the formula of the complex is

$$\left[CrCl(H_2O)_5\right]Cl_2.H_2O$$

2. (3)

(A) O_2^- = 8 + 8 + 1 = 17 : Paramagnetic

(B) CN^- = 6 + 7 + 1 = 16 : Diamagnetic

(C) CO = 8 + 6 = 14 : Diamagnetic

(D) $\overset{+}{N}O$ = 7 + 8 – 1 = 14 : Diamagnetic

3. (1)

In third period, 3s and 3p-orbitals are filled. Total orbitals to be filled = one s + three p = 4. Thus, number of elements = 4 × 3 = 12

4. (1)

0.5 molal aqueous solution means 0.5 mol of solute is present in 1000 g of water.

Hence, mole of water $= \frac{1000}{18} = 55.5$

Thus, mole fraction of solute $= \frac{n_{solute}}{n_{solute} + n_{solvent}}$

$$= \frac{0.5}{0.5 + 55.5}$$

$$= \frac{0.5}{56}$$

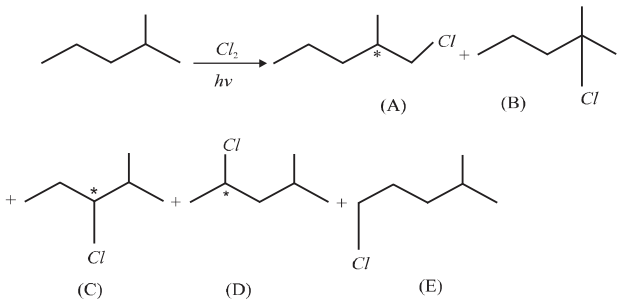
$$= \frac{5}{560} = \frac{1}{112}$$

5. (4)

Correct matches are:

List-I	List-II
(A) Phenol	Reimer-Tiemann
(B) Acetic acid	Hell-Volhard-Zelinsky
(C) Formaldehyde	Cannizzaro
(D) Toluene	Etard

6. (3)



Each chiral centre generates two optically active compounds.

Thus, total number of optically active compounds will be 2 × 3 = 6.

7. (3)

$$\text{Mass percentage} = \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100$$

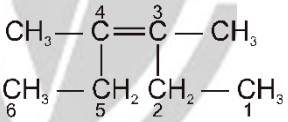
$$= \frac{(3 \times 60)g}{(3 \times 60)g + 1000g} \times 100$$

$$= \frac{180g}{180g + 1000g} \times 100$$

$$= \frac{180g}{1180g} \times 100 = 15.25\%$$

[Moles of solute = 3, mass of solvent = 1000 g]

8. (1)



3,4-Dimethylhex-3-ene

9. (1)

$X(g) \rightarrow X^+(g) + e^-$

If I.E. is ionization enthalpy, then

$\therefore$ $\frac{N_A}{2}$ (I.E.) = E_1

$\therefore$ $I.E. = \frac{2E_1}{N_A}$

$X(g) + e^- \rightarrow X^-(g)$

If $\Delta_{eg}H$ is election gain enthalpy, then

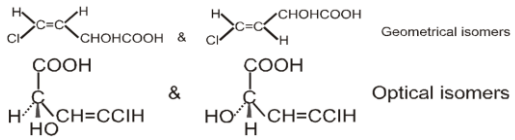
$\therefore$ $2N_A(E.A.) = -E_2$

$\therefore$ $\Delta_{eg}H = -\frac{E_2}{2N_A}$

10. (1)

Internal energy is a state function.

11. (1)



$ClCH = CHCH(OH)COOH$ &
$CH_2 = C(Cl)CH(OH)COOH$: Position isomers
$ClCH = CHCH(OH)COOH$ &
$O = CH - CH(Cl)COOCH_3$: Functional isomers

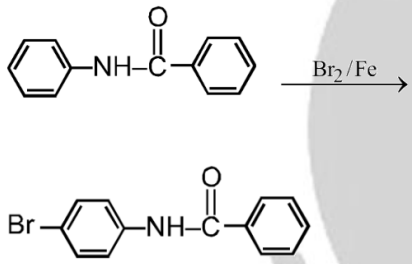
12. (1)

Addition of inert gases at constant volume will not affect the equilibrium. When an inert gas is added to the system at constant temperature equilibrium will shift towards the direction in which there is increase in number of moles of gases.

13. (4)

It is S_N2 reaction.

14. (2)



15. (3)

As stability of conjugate bases by more dispersion of negative charge increases, the acidity of conjugate acids increases. Hence the correct order of stability of conjugate base is $ClO_4^- > ClO_3^- > ClO_2^- > ClO^-$ and acidity is $HClO_4 > HClO_3 > HClO_2 > HClO$.

16. (3)

Haemoglobin acts as oxygen carrier in the blood for Fe^{2+} ions of each hemoglobin can bind with four molecules of O_2 and form oxy-haemoglobin.

$$4Hb + 4O_2 \rightarrow Oxy - \underset{\text{haemoglobin}}{Hb_4O_8}$$

17. (1)

In CCl_4 carbon atom does not have d-orbitals to accommodate a lone pair of electrons and hence is not a Lewis acid. In PCl_3, $SbCl_3$ and $BiCl_3$ central atom has empty d-orbitals in each case but electronegativity of P is maximum, hence PCl_3 is the strongest acid.

18. (4)

Sc^{3+} has zero unpaired electrons.

19. (3)

Only s and d-orbitals have center of symmetry.

20. (3)

Any species containing odd number of electrons.

21. (1)

$A_0 - A_t = kt$

22. (1)

In an ideal reversible process, the system maintains equilibrium at every intermediate step and the process is extremely slow. Thus, from a theoretical point of view, an ideal reversible process should require an infinite time for its completion.

23. (2)

Reaction of phenyl benzoate with an excess of methyl magnesium bromide gives a mixture of 2-phenylpropan-2-ol and phenol.

24. (1)

Allylic cation undergoes rearrangement to give least substituted bromide.

25. (1)

The monomers of DNA are called nucleotides. Nucleotides have three components: a base, a sugar (deoxyribose) and a phosphate residue.

26. (1)

Most natural sugars are D and most natural amino acids are L. One method for determining whether a molecule is D- or L- by looking at the Fischer projection of a molecule.

27. (1)

Hydroboration-Oxidation is a two-step pathway used to produce alcohols. The reaction proceeds in an Anti-Markovnikov manner, where the hydrogen (from BH_3 or BHR_2) attaches to the more substituted carbon and the boron attaches to the least substituted carbon in the alkene double bond.

28. (2)

Dextro-isomers are represented by putting (+) before their name.

29. (4)

In CS_2 $p\pi$–$d\pi$ multiple bonding exists.

30. (1)

$$CH_3CH_2.CO.CH_2CH_2CH_3 \xrightarrow{NaBH_4} CH_3CH_2\underset{\underset{OD}{|}}{\overset{\overset{O^-}{|}}{C}}HCH_2CH_2CH_3 \xrightarrow{D_2O} CH_3CH_2\underset{\underset{OD}{|}}{C}HCH_2CH_2CH_3$$

31. (3)

Acidity is decided by stability of conjugate base.

32. (1)

$\Delta G^o = -nFE^o_{cell} = \Delta H^o - T\Delta S^o$

$-T\Delta S^o = -nFE^o_{cell} = \Delta H^o$

$$-\Delta S^o = \frac{\left(2\times 9687\times 4.315 - 825.2\times 10^3\right)}{298}$$

$\Delta S^o = 25\ J\ K^{-1}$

33. (2)

In solid state, PCl_5 is an ionic solid with $[PCl_4]^+$ tetrahedral and $[PCl_6]^-$ octahedral.

34. (2)

We have to calculate the partial pressure of solution which is ideal. So, Ps = P(A) + P(B)

Now we have to use Raoult's law to calculate the partial pressure of A and B.

$P_A = X_A P_A^o$ and $P_B = X_B P_B^o$

So, $P_A = 21 \times 1/3 = 7$ kPa

and $P_B = 18 \times 2/3 = 12$ kPa

So, $P_{solution} = 7 + 12 = 19$ kPa

35. (1)

$$pNH_3 = pH_2S = \frac{20}{2}\text{atm}$$

$$K_p = pNH_3 \times pH_2S = 100\,\text{atm}^2$$

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

$$100 = K_c \times (0.0821\times 400)^2$$

$$K_c = 0.092\,M^2$$

36. (4)

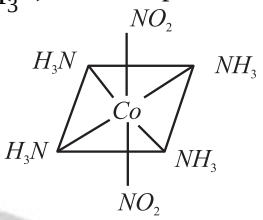
Total number of N–Co–O bonds = 8.

37. (4)

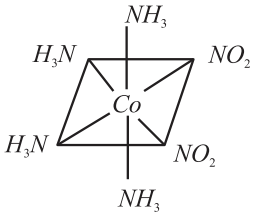
(i) NO_2 is an ambidentate group. It can show linkage isomerism.

(ii) The complex can show ionization isomerism with the complex $\left[Co(NH_3)_4NO_2(Cl)\right]NO_2$.

(iii) The complex shows geometrical isomerism.



Trans-isomer



Cis-isomer

38. (3)

Molten sodium chloride conducts electricity due to the presence of free ions. In order to conduct electricity a substance must have charged particles, such as electrons and ions, that are free to move freely through it. In the solid state, ionic compounds such as sodium chloride have their ions fixed in position and therefore these ions cannot move so solid ionic compounds cannot conduct electricity. However in the molten state, ions in ionic compounds are free to flow and therefore molten sodium chloride can conduct electricity.

39. (3)

$W_B = 6.5$ g. $W_A = 100$ g,

Ps = 732 mm, $K_b = 0.52$,

$T_b^o = 100^oC, P^o = 760\,mm$

$$\frac{P^\circ - P_s}{P^\circ} = \frac{n_2}{n_1}$$

$$\Rightarrow \frac{760-732}{760} = \frac{n_2}{100/18}$$

$$\Rightarrow n_2 = \frac{28\times 100}{760\times 18} = 0.2046\,\text{mol}$$

$\Delta T_b = K_b \times m$

$$T_b - T_b^o = K_b \times \frac{n_2\times 1000}{W_A(g)}$$

$$T_b - 100^oC = \frac{0.52\times 0.2046\times 1000}{100}$$

40. **(4)**

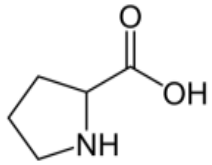
Here OH and double bond in reactant should be untouched in the product.

Hence, Wolf-Kishner reduction reaction will proceed.

41. **(1)**

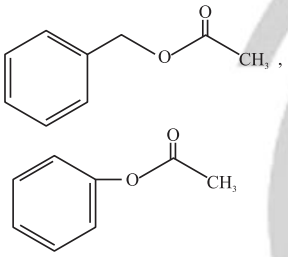
Pyridoxine

42. **(3)**



43. **(4)**

Structure of benzyl acetate and phenyl acetate is as follows:



$$\Delta E = E_2 - E_1$$

44. **(4)**

$$= \left(-\frac{13.6}{2^2}\right) - \left(-\frac{13.6}{1^2}\right)$$

$$= 13.6\left(1 - \frac{1}{4}\right) = \frac{3}{4} \times 13.6 = 10.2 \text{ eV}$$

45. **(3)**

Methane, ammonia and water, the respective central atoms are sp^3 hybridized but they have different bond angles.

46. **(3)**

For 1st reaction, $\Delta rG^o < 0$ that means the process is spontaneous and reaction is feasible, so, for lead more characteristic oxidation state will be +2. For II reaction, $\Delta rG^o < 0$ that means the process is non-spontaneous and reaction is not feasible, so, for tin more characteristic oxidation state will be +4.

47. **(1)**

As the temperature increases pH and pOH both will decrease.

48. **(3)**

Reaction of oxygen with Al will be as:

$$4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$$

According to stoichiometry coefficient, 4 mole of Al react with = 3 mole of O_2.

So, 1.5 mole of O_2 react with

$= 1.5 \times \frac{4}{3}$ mole of Al

So, mole of Al = 0.5 × 4 = 2 mole

Molar mass of Al = 27 g/mol

So, mass of Al = 2 × 27 = 54 g

49. **(4)**

When $k_1 = k_2$,

$10^{15}.e^{-2000/T} = 10^{14}.e^{-1000/T}$

$10 = e^{-1000/T}$

$2.303 \log 10 = \frac{1000}{T}$

$T = 434.2 K$

50. **(4)**

As we move down the group, electronegativity of central atom decreases so bond angle decreases.