

2023

Time - 3 hours

Full Marks - 60

Answer all groups as per instructions.

Figures in the right hand margin indicate marks.

GROUP - A

1. Answer all questions and fill in the blanks as required. [1 × 8]

- (a) According to Bohr, angular momentum is equal to _____.
- (b) How many number of radial nodes are found in 3s orbital ?
- (c) A covalent bond is formed by _____ of electrons.
- (d) _____ hybridisation is found in graphite.
- (e) Homolysis of covalent bond results _____.
- (f) Give an example of electrophile and nucleophile.
- (g) Whether pyrrole is aromatic or non-aromatic ?
- (h) How many π bonds are present in Buta-1,3-diene ?

[2]

GROUP - B

2. Answer any eight of the following within two or three sentences each. [1½ x 8

- (a) What is nodal plane ?
- (b) State Aufbau principle.
- (c) What is peroxide effect ?
- (d) Why the shape of water molecule is V shaped ?
- (e) Dichloro acetic acid is a stronger acid than acetic acid, why ?
- (f) Why BCl_3 is non-polar but PCl_3 is polar ?
- (g) Write the product of the reaction of HCl with $\text{CH}_3\text{-CH=C(CH}_3)_2$.
- (h) What is solvation energy ?
- (i) What is electrophile ? Give one example.
- (j) Write two important applications of Inductive effect.

GROUP - C

3. Answer any eight of the following within 75 words each. [2 x 8

- (a) Alkynes and alkanes do not show geometrical isomerism. Explain.

- (b) Write the significance of Azimuthal quantum number.
- (c) Convert Ethyne to Acetaldehyde.
- (d) What is the maximum number of lines when an excited electron drops from $n = 6$ to the ground state in case of Hydrogen atom ?
- (e) Explain Wurtz reaction.
- (f) Draw the M.O. diagram of N_2 molecule and find the bond order.
- (g) How will you prepare acetylene from CaC_2 ?
- (h) Explain the shape of NH_4^+ ion on the basis of hybridisation.
- (i) Assign R, S-configuration to the followings :
- (i)
$$\begin{array}{c} \text{Br} \\ | \\ \text{I}-\text{C}-\text{Cl} \\ | \\ \text{H} \end{array}$$
- (ii)
$$\begin{array}{c} \text{COOH} \\ | \\ \text{H}-\text{C}-\text{OH} \\ | \\ \text{CH}_3 \end{array}$$
- (j) Among LiF and LiI, which has more covalent character and why ?

GROUP - D

*Answer **any four** questions within 500 words each.*

4. Discuss Bohr's theory and write its limitations.

[4 + 2

P.T.O.

[4]

5. Write notes on within 250 words each. [3 × 2]
- (a) Heisenberg Uncertainty Principle
 - (b) Concept of Exchange energy
6. Write notes on within 250 words each. [3 × 2]
- (a) Lattice energy
 - (b) Concept of resonance
7. Discuss about the types, structure and reactivity of alkyl free radical. [2 × 3]
8. How can you prepare Ethene from ethyl alcohol and ethylene chloride ? How does it react with (i) HCl and (iii) Br₂. [1½ × 4]
9. Write notes on within 250 words each. [3 × 2]
- (a) Wurtz reaction
 - (b) Birch reduction
10. Write notes on within 250 words each. [3 × 2]
- (a) Aromaticity
 - (b) Ozonolysis