

Duration : 3 Hours

Max. Marks : 70.

Instructions:

1. Attempt all questions.
2. Write each section in a separate answer book.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks allocated to that question.
5. Draw diagrams/figures whenever necessary.

SECTION - 1

Q-1 (A) Do as directed.

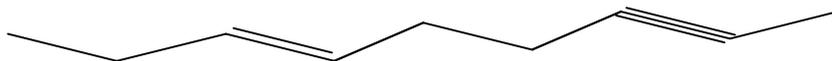
[07]

- I) Define covalent bond.
- II) Give reason chloroacetic acid is stronger acid than acetic acid.
- III) Define intermolecular and intramolecular hydrogen bonding.
- IV) Classify polar and non polar molecules from following example
 $\text{Cl}_2, \text{H}_2\text{O}, \text{NH}_3, \text{O}_2, \text{HCl}, \text{HF}$
- V) Define singlet and triplet carbenes.
- VI) Why CO_2 has zero dipole moment?
- VII) Write electronic configuration of Cr_{24} and N_7

Q-1 (B) Answer the following in brief. (Any 4)

[08]

- I) Define carboanion and comment on stability.
- II) What is the hybridization state of each of the carbon atoms in following compound



- III) Give statement for Markovnikov's and anti-Markovnikov's rule.
- IV) Define keto-enol tautomerism.
- V) Write reaction when ethylbromide is allowed to react with magnesium in presence of dry ether.
- VI) Write reaction when 2-butyne is allowed to react with water in presence of H_2SO_4

Q-2 Answer the following.

[10]

- A) Write methods of preparation for alkane.

OR

- A) Write note on inductive effect and electromeric effect.
- B) Write reactions given by alkenes

OR

- B) Write methods for preparation and reactions given by free radicals.

Q-3 Answer the following in detail. (Any 2)

[10]

- A) Write methods of preparation for alkynes.
- B) Explain in detail molecular orbital theory.
- C) Derive and explain Schrödinger's wave equation.

SECTION - 2

Q-4 (A) Do as directed.

[07]

- I) Define the term geometrical isomer with suitable example.
- II) Write structure for bicyclobutane.
- III) Write Aldol condensation reaction.

- IV) Write Williamsons synthesis for ethers.
- V) Define polycyclic compounds.
- VI) What is Lucas reagent?
- VII) Write reaction when benzyl chloride react with aqueous NaOH.

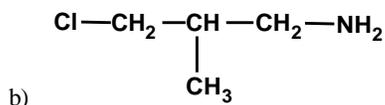
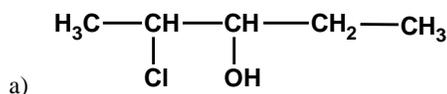
Q-4 (B) Answer the following in brief. (Any 4)

[08]

- I) Give classification of dienes with suitable examples.
- II) Write a reaction when cyclopentene is allowed to react with perbenzoic acid in chloroform.
- III) Draw and specify as R or S enantiomers (if any) of
 - I) 3-Chloro-3-methylpentane
 - II) 1,3-dichloropentane

- IV) Write structure for sec. Butyl Iodide, Isobutyl Iodide and n-butyl Iodide

- V) Write IUPAC name of the following.



- VI) Define stereo selective and stereo specific reaction.

Q-5 Answer the following.

[10]

- A) Explain two chemical reactions with example to differentiate primary, secondary and tertiary alcohols.

OR

- A) Write methods of preparation for alkyl halides.
- B) Write methods of resolution for racemic modification.

OR

- B) Draw all staggered and eclipsed conformation that results from rotation about C₂-C₃ bond of butane and answer the following questions.
 - a) Which conformer is most stable and why?
 - b) Which conformer is least stable and why?
 - c) Write different isomers of butane with its systematic name.

Q-6 Answer the following in detail. (Any 2)

[10]

- A) Write note on microwave synthesis and green chemistry.
- B) Convert
 - a) Cyclopentanol to cyclopentane
 - b) Diethyl ether to ethylbromide
- C) Explain in detail SN² reaction in alkyl halides.