

[Time: 3 Hours]

[Marks: 100]

Please check whether you have got the right question paper.

- N.B:**
1. All questions are compulsory.
 2. All questions carry equal marks.
 3. Figures to the right indicates full marks.
 4. The use of log table/non-programmable calculator is allowed.

Q.1 Answer any four of the following:

- A Explain the stereospecificity when but-2-ene undergoes epoxidation using a peracid followed by acid hydrolysis. 05
- B Explain the primary structure of proteins? Draw the structure of
i) Gly-Ala. ii) Gly-Ala-Gly. 05
- C Explain the following with one example:
i) Enantiomeric excess. ii) Diastereomeric excess. 05
- D Explain the stereospecificity of the addition reaction of bromine to but-2-ene. 05
- E What are basic α - amino acids? Give one example. How is glycine prepared by Strecker synthesis? 05
- F Write the following reaction and discuss its stereochemistry.
1-bromo-1,2-diphenyl propane + KOH/ alcohol -----> 05

Q.2 Answer any four of the following:

- A What is Beckmann rearrangement? Explain its mechanism with a suitable example. 05
- B a) Explain the mechanism of Michael addition reaction. 03
b) Write the application of pinacol-pinacolone rearrangement. 02
- C a) Explain Killiani-Fischer synthesis with suitable example. 03
b) Explain the action of the following reagents on D- Glucose:
i) H_2/Ni ii) Br_2 water 02
- D a) Write the methylation reaction of α -D- Fructopyranose. 03
b) Why sucrose does not show mutarotation? 02
- E Convert open chain Fischer projection formulae into Haworth formulae:
1) α -D- Ribopyranose
2) β -D- Glucopyranose 05
- F a) What is the action of excess of phenyl hydrazine on D-Fructose? 03
b) What are epimers and give one example? 02

Q.3 Answer any four of the following:

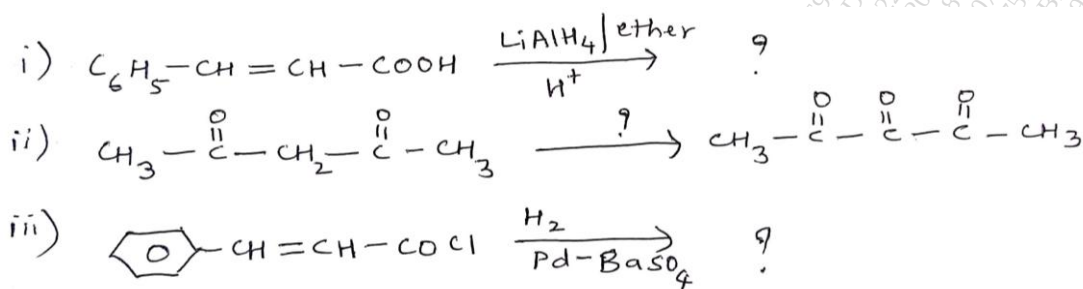
- A How does one determine from IR spectrum? 05
 i. Progress of the reaction.
 ii. Hydrogen bonding in the molecule.
- B Predict the number of signals and the splitting pattern in PMR spectra of the following compounds. 05
 i. Ethyl methyl ketone.
 ii. 1-propanol.
- C An organic compound has the molecular formula $C_4H_8O_2$. Determine the index of its hydrogen deficiency and deduce its structural formula from the following spectral data. Also write the name of the compound? 05
 IR (cm^{-1}): 3000-2500 (broad) , 1740.
 PMR (δ ppm): 1.0 (3H,triplet) , 1.7 (2H, multiplet), 4.2 (2H, triplet) & 10.2(1H,singlet).
- D An organic compound has the molecular formula $C_8H_{10}O$. Determine the index of its hydrogen deficiency and deduce its structural formula from the following spectral data. Also write the name of the compound? 05
 IR (cm^{-1}): 3500, 1600, 1570, 760 & 710.
 PMR (δ ppm): 1.6 (3H,douplet) ,4.2 (1H, singlet, D_2O exchangeable), 4.9 (1H,quartet), 7.4 (5H, multiplet).
- E Explain the hydrolysis of nucleic acids and write the structure of purine bases present in DNA and RNA? 05
- F Explain the secondary structure of RNA & DNA? 05

Q.4 Answer any four of the following:

- A a) What are plastics? Explain the difference between thermoplastics and thermosetting polymer. 03
 b) Give the preparation and application of polystyrene. 02
- B a) Explain Rosenmund reduction with suitable example. 03
 b) What is Lindlar's catalyst? Explain its selectivity. 02
- C a) Give the preparation and uses of Nylon- 6. 03
 b) Write the biomedical uses of synthetic polymer. 02
- D How is Raney-Ni prepared? How is it used in the reduction of the following compounds? 05
 i) Olefins ii) Nitriles iii) Nitro compounds.
- E a) Distinguish between addition polymer and condensation polymer. 03
 b) Write the structure of the polymer obtained by polymerisation of phenol and formaldehyde. 02

F a) Complete the following reactions:

03



b) Write any two uses of m-CPBA in synthetic organic chemistry?

02

Q.5 A State true or false (Any Five)

05

- Polypeptides are derived from two to nine molecules of amino acids.
- Zwitter ion is a dipolar ion.
- Glycine is an example of acidic amino acid.
- Stereochemically equivalent ligands are called homotopic ligands.
- The molecule of ethanal does not have a enantiotopic face.
- In a stereoselective reaction both stereoisomers are equally formed.
- Enzymatic reduction of pyruvic acid is an example of enantiomeric excess reaction.
- S_N1 reaction proceeds with retention of configuration.

Q.5 B Choose the correct option and rewrite the statement (Any Five)

05

- Conversion of aldohexose to aldopentose is _____ method.
(Wohl's / Killiani Fisher / Beckmann)
- _____ number of stereoisomers are possible for a aldohexose.
(6 / 8 / 9)
- The sugar that yields only glucose on its hydrolysis is _____
(Maltose / Lactose / Fructose)
- When monosaccharides are treated with excess phenyl hydrazine they form _____
(Osazones / Phenyl hydrazine / Alcohols)
- The reaction of α -haloketone with alkoxide to give ester is known as _____
(Favorskii rearrangement / Wittig rearrangement / Beckmann rearrangement)
- The reaction of _____ with acid (Conc. H_2SO_4) is called Pinacol- Pinacolone rearrangement.
(Pinacol / Ketoxime / α - haloketone)
- Wittig reagent is _____
(Ph_3P / $Ph_3P=CH_2$ / $[Ph_3PCH_3]^+ I^-$)

Q.5 C State True or False (Any five)

05

- Magnetic anisotropy brings about shielding of aromatic protons.
- Intense absorption band around 1700cm^{-1} indicates the presence of hydroxyl group.
- $3000-1000\text{ cm}^{-1}$ region is known as fingerprint region.
- The type of radiation used in IR spectroscopy is microwaves.
- The aldehydic protons is found at 9-10 ppm in NMR.
- Adenine is a derivative of pyrimidine.
- RNA molecule contains Uracil.
- Adenine and thymine are bonded by two hydrogen bonds.

Q.5 D Match the columns (Any five)

- | | |
|------------------------|---|
| i) Teflon | a) Allylic bromination |
| ii) Neoprene | b) Adipic acid |
| iii) SeO_2 | c) Addition polymer |
| iv) Pd-BaSO_4 | d) Natural rubber |
| v) BaO | e) Chemoselective oxidizing agent |
| vi) NBS | f) Reduction of acid chloride to aldehyde |
| vii) Nylon 66 | g) Stabilizer |
