[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 05
i) Gly-Ala. ii) Gly-Ala-Gly.

C Explain the following with one example: 05
i) Enantiomeric excess. ii) Diastereomeric excess.

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. 05
1-bromo-1,2-diphenyl propane + KOH/ alcohol ---------->

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: 02
i) H_2 /Ni ii) Br_2 water

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: 05
1) α–D- Ribopyranose
2) β–D- Glucopyranose

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 (δppm): 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 (δppm): 1.6 (3H,doublet) ,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

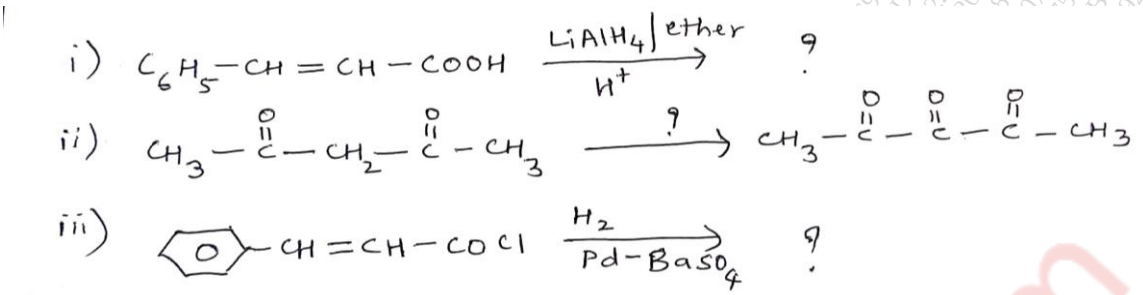
B a) Explain Rosenmund reduction with suitable example. 03
b) What is Lindlar's catalyst? Explain its selectivity. 02

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

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

Q.5 B Choose the correct option and rewrite the statement (Any Five) 05

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

Q.5 C State True or False(Any five) 05

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

Q.5 D Match the columns (Any five) 05

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

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