[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 What are stereospecific reactions? Explain the stereospecificity when but-2-ene undergoes hydroxylation using $KMnO_4$. 05

B A Chiral alcohol reacts with thionyl chloride? Write the reaction and its mechanism. Explain the stereochemistry involved in it. 05

C Define Topicity. Explain the following with one example: 05
i. Enantiotopic ligands
ii. Diastereotopic ligands

D "Addition of bromine to but-2-ene is a stereospecific reaction". Explain. 05

E What are α- amino acids? How is alanine prepared from K- phthalimide? 05

F Prepare a tripeptide by using the Merrifield solid phase polypeptide synthesis? 05

Q.2 Answer any four of the following:

A What is pinacol-pinacolone rearrangement? Explain its mechanism with an example. 05

B a) Explain the mechanism of Michael addition reaction. 03
b) Write any two applications of Beckmann rearrangement. 02

C a) Write the reaction for the formation of Osazone of D-glucose in a stepwise manner. 03
b) Define anomers and give one example. 02

D a) Write a brief classification of monosaccharides. 03
b) Explain oxidation of D- Glucose with i) Conc. HNO_3 ii) Br_2 water. 02

E Convert open chain Fischer projection formulae into Haworth formulae: 05
1) α–D-Glucopyranose
2) α–D- Ribopyranose

F Explain the methylation reaction with methanol in dry $HCl_{(g)}$ and dimethyl sulphate using NaOH on α–D-Glucopyranose. 05

756BE8D075687CC3F920467E9428EF06

Q.3 Answer any four of the following:

A Explain the following terms: 05
i) Symmetrical and asymmetrical stretching vibrations.
ii) Finger print region.

B Predict the number of signals and the splitting pattern in PMR spectra of the following compounds. 05
1. 1-bromo propane
2. Ethyl methyl ether

C An organic compound has the molecular formula $C_4H_7BrO_2$. 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, 1715.
PMR (δ ppm): 1.08(3H,triplet), 2.07 (2H, multiplet), 4.23(1H,triplet), 10.95 (1H, singlet)

D An organic compound has the molecular formula C_4H_8O. 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}) : 1740 cm^{-1} sharp band.
PMR (δ ppm): 1.1(6H, doublet) , 2.3(1H, multiplet) , 9.4 (1H, doublet)

E Give the structure of purine and pyrimidine bases present in DNA and RNA? 05

F a) Explain the hydrolysis of nucleic acids? 03
b) Write the structure of sugars present in nucleic acids? 02

Q.4 Answer any four of the following:

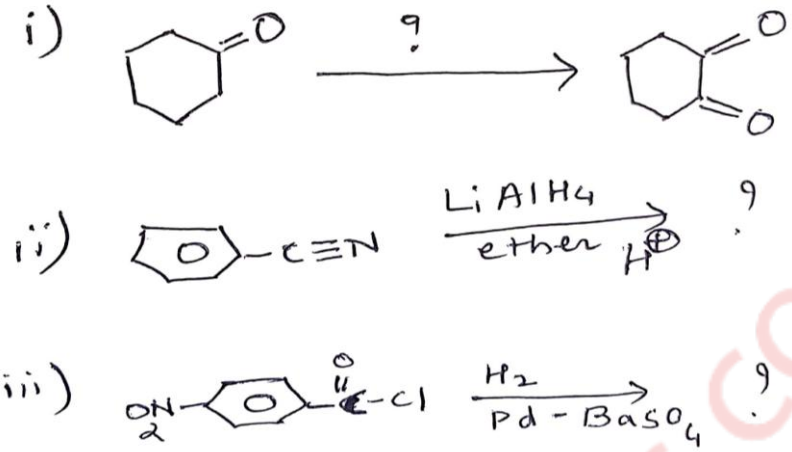
A a) Give the preparation and uses of Nylon- 66. 03
b) What is addition polymerization? 02

B a) Write the applications of NBS as a catalyst. 03
b) What is Lindlar's catalyst? Explain with one example. 02

C a) Write the functions of the following additives? 03
i) Plasticizers ii) Stabilizers iii) Fillers
b) What are biodegradable polymers? 02

756BE8D075687CC3F920467E9428EF06

D a) Complete the following reaction: 03



b) Give the reaction for the reduction of acetyl chloride to ethanol by LAH. 02

E What is diene polymerisation? Explain 1, 2 and 1, 4 addition polymerization. 05

F a) Expain the use of SeO_2 in oxidation of active methylene, methyl and allylic H –atom with a suitable example. 03

b) Give oxidation of alkenes to epoxide by using m-CPBA. 02

Q.5 A State true or false (Any Five) 05

a) Serine is an acidic α- amino acid.
b) Zwitter ion reacts with an acid as well as a base.
c) Proteins contain nitrogen.
d) The reduction of but-2-yne in the presence of Pd is an example of a diastereoselective reaction.
e) Acetaldehyde does not have a enantiotopic face.
f) Meso – tartaric acid has a plane of symmetry.
g) S_Ni reaction proceeds with inversion of configuration.
h) All stereospecific reactions are stereoselective in nature.

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

a) Epimer of D(+)Glucose is_____
(D(+) Mannose / D(+) Ribose / D(+) Fructose).
b) _____ number of stereoisomers are possible for a ketohexose.
(6 / 8 / 9)
c) _____ molecule is non - reducing disaccharide.
(Sucrose / Maltose / Lactose)
d) The reduction of D(+)Glucose with $NaBH_4$ gives_____.
(Mannitol / Sorbitol / Mannitol+Sorbitol))
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 is called Beckmann rearrangement
(Pinacol / Ketoxime / α- haloketone)
g) _____ of the following is Wittig reagent.
(Ph_3P / $Ph_3P{=}CH_2$ / $[Ph_3PCH_3]^+ I^-$)

756BE8D075687CC3F920467E9428EF06

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

a) Magnetic anisotropy brings about deshielding of aromatic protons.
b) Intense absorption band around 1700cm^{-1} indicates the presence of carbonyl group.
c) 2000-1000cm^{-1} region is known as fingerprint region.
d) The type of radiation used in NMR spectroscopy is microwaves.
e) The acidic proton of a carboxylic acid is found at 10-12ppm in NMR.
f) Guanine is a derivative of pyrimidine.
g) DNA molecule contains Thymine.
h) Adenine and thymine are bonded by three hydrogen bonds.

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

i) PVC	a) Reduction of ketones to secondary alcohol
ii) $NaBH_4$	b) Allylic hydroxylation
iii) Phenol formaldehyde resin	c) Allylic bromination
iv) NBS	d) Thermoplastic
v) SeO_2	e) Backelite
vi) CaO	f) Synthetic rubber
vii) Buna-S	g) Stabilizer

****

756BE8D075687CC3F920467E9428EF06