MCHT 3.2

III Semester M.Sc. Degree Examination, September 2016
CHEMISTRY
Organic Chemistry – III

Time: 3 Hours Max. Marks : 80

Instruction : *Answer* ***any eight*** *questions from Part –* ***I*** *and* ***any four*** *full questions from Part –* ***II****.*

PART – I **(8×2=16)**

i. What are allowed and forbidden transition ? Explain with examples.

ii. Cis-1,2- dichloroethene is Infra-Red active while trans-1,2- dichloroethene is IR inactive. Explain.

iii. With example explain the influence of electron density on chemical shift.

iv. What is vicinal spin-spin coupling ?

v. Write the pattern of NMR spectra of ethyl alcohol and specify the δ value of each proton.

vi. Explain the terms singlet and triplet state.

vii. Name and write the different isomers of benzene molecule under photochemical condition.

viii. Why furon is less aromatic than pyrrole ? Give reason.

ix. What is Reimer-Tiemann reaction (formylation) ? Give an example.

x. Explain the any one method of synthesis of Azepine.

PART – II

1. a) In IR spectrum of acetylene – C = C – H str appears at about 3300 cm^{-1}. How will you distinguish it from an O–H str in ethyl alcohol ?

   b) Write the important IR regions of absorption for

   O–H str for alcohols

   O–H str for carboxylic acids

   N–H str for primary and secondary amines.

   c) With example explain the McLafferty Rearrangement. **(4+6+6 = 16)**

2. d) Write a note on different types of coupling constants observed in organic molecules.

   e) What is DEPT ? Discuss the determining ^{13}C signal multiplicity using DEPT.

   f) Explain the theory of 2D NMR. **(6+6+4 =16)**

3. g) Explain why benzophenone is used as photosensitizer to get triplet 1,3-butadiene state instead of direct photolysis ?

   h) Discuss Norrish type I and Norrish type II cleavage with suitable examples.

   i) Explain the various reactions possible with singlet molecular oxygen. **(6+6+4 =16)**

4. j) Compare the stability of 3 and 4 membered heterocycles. Write the any two common reactions observed in 3 membered heterocycles.

   k) Explain the directing effect of substituents in benzo [b] furan.

   l) Explain the synthesis and reactions of Pyrimidines. **(6+4+6 =16)**

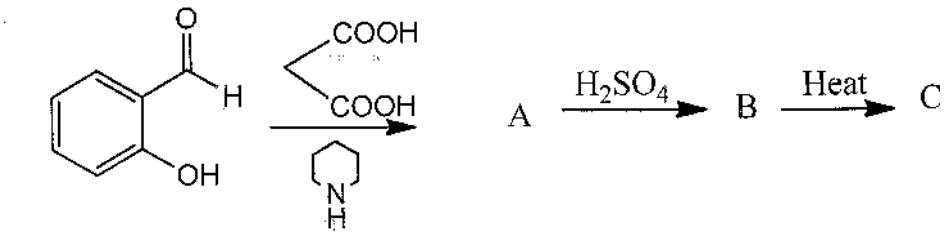
5. m) Explain red shift and blue shift in UV-Visible spectroscopy.

   n) What is molecular ion peak ? Write the important fragment peaks for benzyl alcohol and acetophenone.

   o) Discuss the effect of dihedral angle and substituent effects on chemical shifts in cyclohexane ring system. **(6+4+6 =16)**

6. p) Draw the Jablonski diagram and define the terms phophosrescence and fluorescence.

q) Write the structure of the products for the following reaction scheme.



r) What is Di-pi- methane rearrangement ? Explain with example. **(6+4+6 =16)**