# DPA – 530 (Che)

**First Year M.Sc. (Chemistry) Degree Examination, July/August 2011**
**(Directorate of Distance Education)**
**DECHEM – 1.03 : CHEMISTRY – III**
**(Organic Chemistry – I)**

Time : 3 Hours Max. Marks : 75/85

***Note** : 1) **Scheme** : **75** Marks - Answer Part – **A** (**any TEN** subdivisions), any **TWO** questions from Part – **B** and **THREE** questions from Part – **C**.*
*2) **Scheme : 85** Marks - Answer Part – **A** (**any TEN** subdivisions), any **TWO** questions from Part – **B** and **THREE** questions from Part – **C** and **ONE** question from Part – **D**.*

PART – A **(10×2=20)**

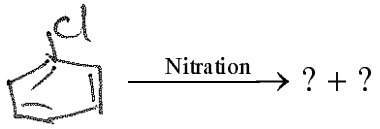
1. a) What are electrophiles and nucleophiles ? Give two examples for each.

   b) Explain the stability of carbonium ions ?

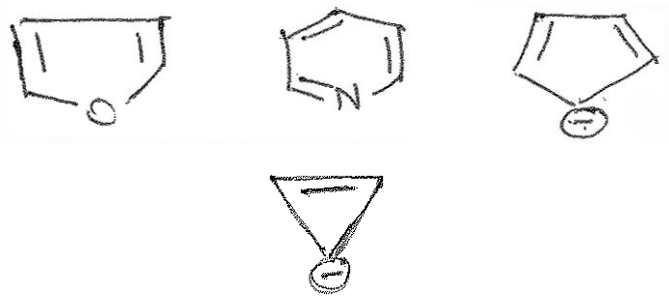
   c) How are free radicals generated ? Write two reactions of free radicals.

   d) What are diastereoisomers and enantiomers ? Write one example for each.

   e) Complete the following reaction.




   f) Classify the following as aromatic and non-aromatic using Huckel's rule.




   g) Write R and S configurations for 1-chloro-2-butanol.

**P.T.O.**

h) State the rules governing the addition reactions of alkenes.

i) Write the ring structure for maltose.

j) Give an example to illustrate the Saytzeff's rule.

k) What is meant by Walden inversion ? Give an example.

l) What are crown ethers ? How are they useful in organic synthesis ?

m) Why is pyrrole less basic than pyridine ?

n) What are peptides ? How are they synthesized ?

o) What is meant by racemization and epimerisation ?

PART – B **(8×2=16)**

2. a) Explain the formation and stability of carbenes.

   b) Write R and S configurations for :

      i) Lactic acid ii) Tartaric acid **(4+4=8)**

3. a) What is SN2 reaction ? Explain its mechanism with a suitable example.

   b) Describe the aromaticity of tropylium cation. **(4+4=8)**

4. a) Complete the reaction and suggest the mechanism.

$$\xrightarrow[\text{Conc.}H_2SO_4\,\Delta]{\text{Conc.}HNO_3} ?$$

   b) Write the mechanism of Fischer Indole synthesis. **(4+4=8)**

PART – C **(13×3=39)**

5. a) How amino acids are classified ? Give azolactone synthesis of phenylalanine.

   b) How the structure of proteins are deduced by end group analysis ?

   c) Discuss the synthesis and electrophilic reactions of pyrrole. **(4+4+5=13)**

6. a) What are carbocations ? How are they generated ? Give one reaction which involves carbocation. Write its mechanism.

   b) Write any two methods of synthesis of isoquinoline. **(7+6=13)**

7. a) What is cope elimination reaction ? Write its mechanism by taking a suitable example.
   b) Elucidate the structure of cellulose. **(7+6=13)**

8. a) Define aromaticity. Explain the aromaticity of cyclopentadienyl anion and benzene.
   b) Discuss the steriochemistry of addition reactions of $>C=O$ and $>C=N^-$ systems.
   c) List out the applications of 18 crown-6-ether and write its structure. **(5+4+4=13)**

9. a) Compare the aromaticity of furan, pyrrole and thiophene.
   b) Explain the synthesis of alanine by hydantoin synthesis.
   c) Write a note on tertiary structure of proteins. **(5+4+4=13)**

## PART – D

10. a) What are cis-trans, syn-anti and E, Z notations in geometrical isomerism ?
    b) Write a note on steriochemistry of biphenyls and spiranes. **(5+5=10)**

11. a) Elucidate structure of sucrose.
    b) Write any two methods for the synthesis of furan and pyridine. **(5+5=10)**