

**CHE-502****Organic Chemistry**

M.Sc. Chemistry (MSCCH-12/13/16/17)

First Year, Examination, 2018

**Time : 3 Hours****Max. Marks : 80**

**Note :** This paper is of **eighty (80)** marks containing **three (03)** Sections A, B, C. Attempt the questions contained in these Sections according to the detailed instructions given therein.

**Section-A****(Long Answer Type Questions)**

**Note :** Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. Discuss in detail different methods for the structural elucidation of alkaloids.
2. Describe in brief :
  - (a) Biosynthesis of terpenoids
  - (b) Glucosazones
  - (c) Relative and absolute configuration
  - (d) Synthesis of quinoline and its applications
3. What are carbohydrates ? Discuss their classification and explain the following terms with respect to carbohydrates :
  - (a) Mutarotation

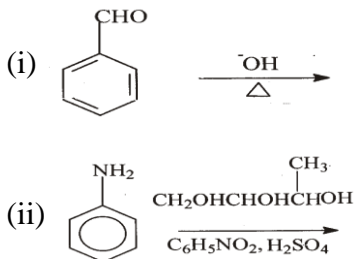
- (b) Applications
  - (c) Epimerization
  - (d) Reducing and non-reducing sugars
4. Attempt any *four* of the following questions :
- (a) Enumerate the methods used for resolution of a racemic mixture.
  - (b) Draw the energy profile diagram of nucleophilic substitution reaction.
  - (c) Discuss aromaticity of non-benzenoid aromatic compounds.
  - (d) Maleic acid is reacted with Osmium tetroxide followed by hydrolysis. Write the stereostructure of the product in two different ways.
  - (e) Give a general definition of chirality and support it with examples.

### Section-B

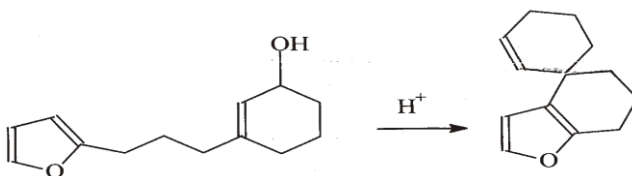
#### (Short Answer Type Questions)

**Note :** Section 'B' contains eight (08) short answer type questions of eight (08) marks each. Learners are required to answer *four* (04) questions only.

1. What are terpenoids ? How are they classified ? Discuss with structures.
2. Complete the following reactions with mechanism and applications :



3. What is hyperconjugation ? How this effect is helpful to explain the following properties ?
  - (a) Structural stability
  - (b) Reactivity
  - (c) Dipole moment
4. Discuss aromaticity, antiaromaticity and non-aromaticity by using suitable examples.
5. Show the products of Markonikov and anti-Markonikov addition of  $\text{H}_2\text{O}$  to the double bond of 1-methylcyclohexene and reaction condition for each pathway.
6. (a) Indole shows better selectivity for electrophilic substitution than benzofuran. Explain.  
 (b) Give the mechanism for this reaction :




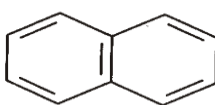
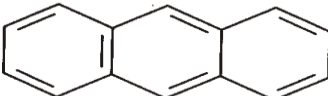
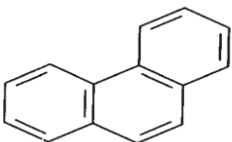
7. Discuss synthesis and uses of :
  - (a) Isoquinoline
  - (b) Piperidine
8. Discuss the following :
  - (a) Factors affecting nucleophilic substitution reactions
  - (b) Atropisomerism and concept of molecular dissymmetry
  - (c) Aromaticity in heterocyclic compounds
  - (d)  $\text{S}_{\text{N}}^{\text{i}}$  reactions

**Section-C****(Objective Type Questions)**

**Note :** Section 'C' contains ten (10) objective type questions of one (1) mark each. All the questions of this Section are compulsory.

Choose correct options to answer :

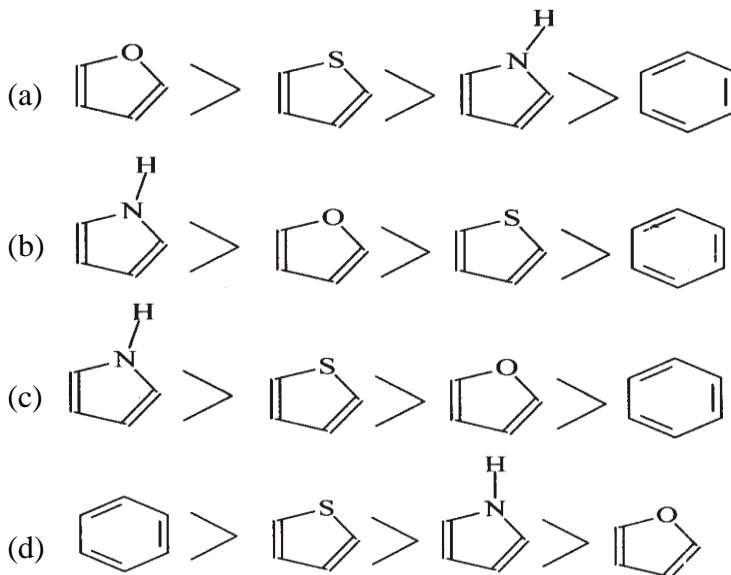
1. Which of the following compounds is most stable ?

- (a) 
- (b) 
- (c) 
- (d) 

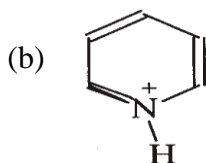
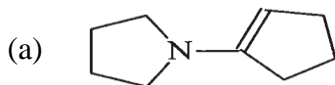
2. When aniline is treated with glycerol in presence of sulfuric acid and nitrobenzene we get quinoline ? This reaction is called :

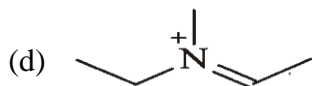
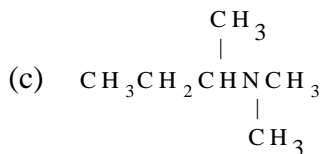
- (a) Fischer synthesis  
(b) Skraup's synthesis  
(c) Corey-house synthesis  
(d) Hoffmann reaction
3. Which of the following is not an alkaloid ?
- (a) Quinine

- (b) Cocaine  
 (c) Eudesmol  
 (d) Reserpine
4. The correct order of relative reactivity towards electrophilic substitution reaction is :

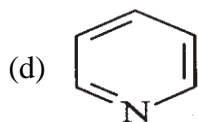
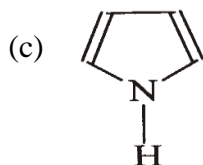
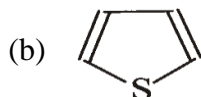
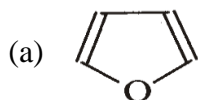


5. Which one among the following compounds is enamine ?

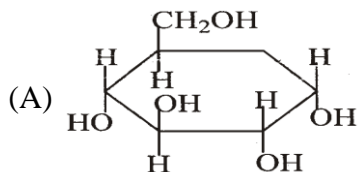


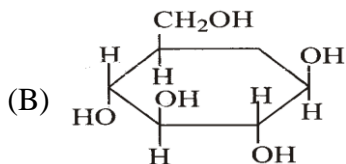


6. Which among the following compounds undergo electrophilic substitution reaction in drastic conditions ?



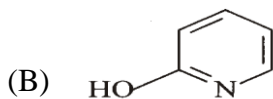
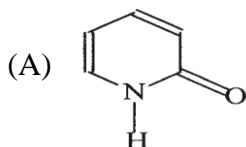
7. Haworth's projection of  $\alpha$ -D-glucose is :





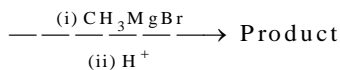
- (a) A  
(b) B  
(c) Both A and B  
(d) None

8. What is the relationship between A and B ?



- (a) They are tautomers  
(b) They are aromatic  
(c) Both A and B  
(d) None of these

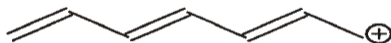
9. Isoprene + Methyl vinyl ketone  $\xrightarrow[\text{reaction}]{\text{Diels' Alder}}$  A



Identify the product :

- (a)  $\alpha$  -pinene

- (b)  $\alpha$  -terpineol
  - (c) Citral
  - (d) Menthol
10. How many other major contribution resonance structures are possible for the following ?



- (a) One
- (b) Two
- (c) Three
- (d) Four