

**M.Sc. CHEMISTRY**  
**SCLS, JAMIA HAMDARD**  
**SEMESTER- IV EXAMINATION 2019**  
**PAPER CODE: MCHCCO-403**  
**PAPER TITLE: HETEROCYCLIC CHEMISTRY**

Time: 3 hr

Maximum marks: 75

(Write your Roll No. at the top immediately on receipt of this question paper)

Attempt ALL questions. All parts of a question must be answered in continuation.

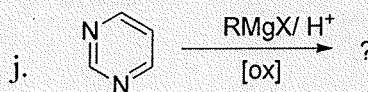
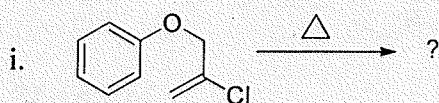
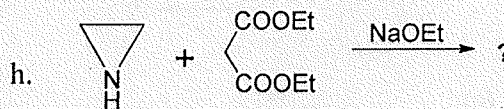
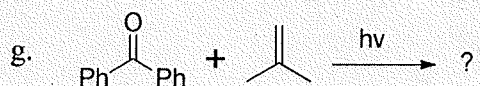
Q1. Answer all the questions given below

10 x 1.5 = 15

I. Answer the following very briefly (a-f):

- Why NMR spectra of aromatic compounds do differs from non-aromatic and aliphatic compounds?
- Why pyridine is more susceptible to nucleophilic substitution than electrophilic substitution?
- Why pyridine does not undergo Friedel Crafts reaction?
- Why is thiophene more stable than pyrrole?
- Outline the four tautomeric forms of azepines.
- Arrange the following molecules in the decreasing order of aromaticity.  
Benzene, Pyridine, Pyrazine, Pyrimidine and Pyridazine.

Identify the products formed in the following reactions (g-j)



Q2. Answer ANY TWO of the following:

2 x 7.5 = 15

- Explain the Hantzsch-Widman nomenclature of heterocyclic compounds.
- What is extra hydrogen? How do you manage the extra hydrogen? Explain with suitable examples.
- Write a short note on anomeric effect.
- Explain the consequences of angle strain in small rings.

Q3. Answer ANY TWO of the following:

2 x 7.5 = 15

A. Write a short note on the following reactions:

(i) Darzen's epoxidation

(ii) Corey-Chaykovsky reaction

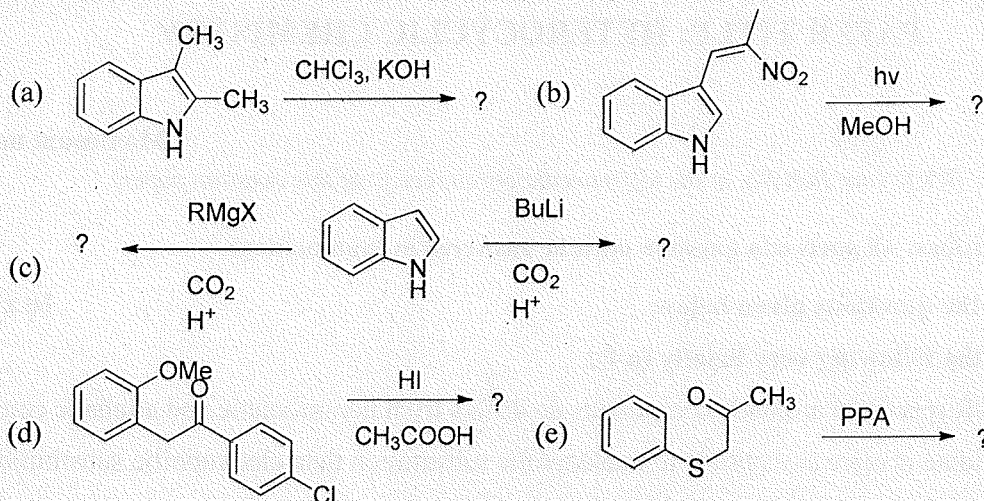
B. Outline the following methods for the synthesis of indole with suitable mechanism.

a) Fischer Indole synthesis

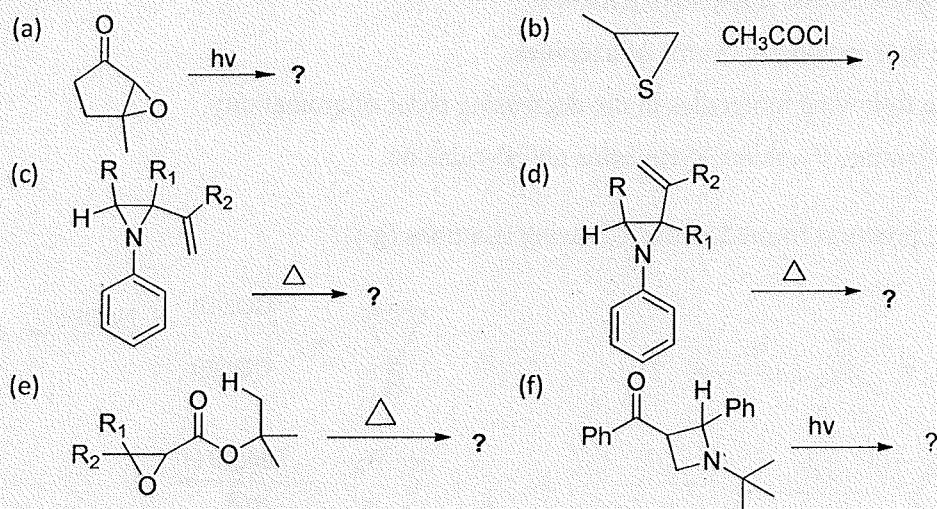
b) Nenitzescu synthesis

c) Reissert synthesis

C. Explain the product formation of the following reactions with suitable mechanism.



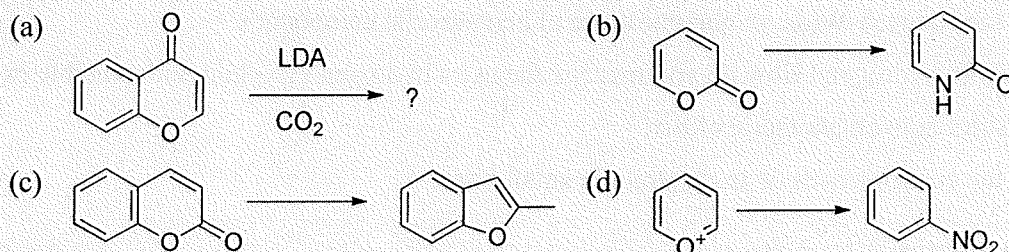
D. Predict the products formed in the following reactions and explain the reaction mechanism.



Q4. Answer *ANY TWO* of the following:

2 x 7.5 = 15

A. Complete the following conversions with suitable mechanisms.



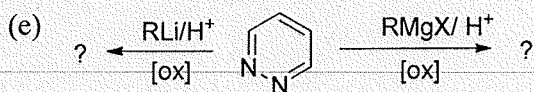
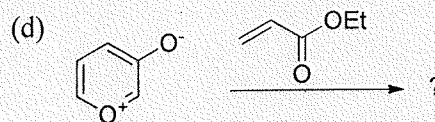
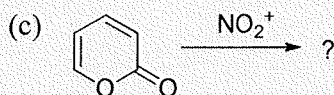
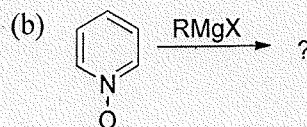
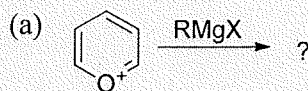
B. Write a brief note on the following reactions:

(a) Diels alder reactions of 2-pyrones

(b) [2+2] cycloaddition reactions of 4-pyrones

(c) Nucleophilic reactions of benzopyridinium salts

C. Predict the products formed in the following reactions



D. Outline at least one synthetic method each for the synthesis of pyrilium salts, pyrone and coumarin.

Q4. Answer **ANY TWO** of the following:

2 x 7.5 = 15

- Outline the synthesis of Phospholes and Boroles.
- Outline any two methods of each for the synthesis of azepines and oxepines.
- Discuss the aromatic character of Phospholes, boroles and phosphorins and their applications in catalysis
- Identify the products (A-F) formed in the following reactions.

