

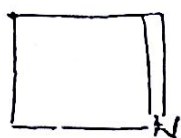
(2 ½ Hours)

[Total Marks : 60

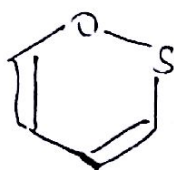
- N.B. : (1) All questions are compulsory.
 (2) Figures to the right indicate full marks.

1. (a) Attempt any two of the following : -

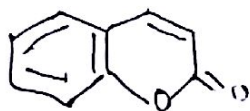
- (i) Name the following compounds according to the system of nomenclature mentioned alongside the structure. 4



Hantzsch-Widman system



Replacement nomenclature System



Common name system



Replacement nomenclature system

- (ii) Draw structures for the following :

- (I) 2- Methylthiirane.
 (II) Benzo [c] thiophene
 (III) Thieno [2, 3-d] oxazole
 (IV) 1,3- Oxathiolane.

4

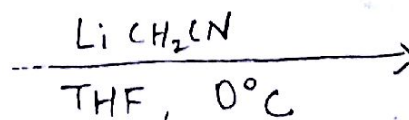
- (iii) (I) Give reasons : The chemical reactions of three membered ring heterocycles involve ring opening.

1

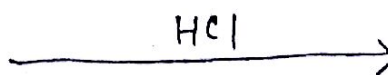
- (II) Complete the following reactions.

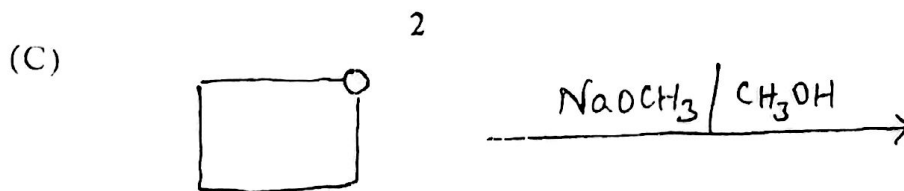
3

(A)



(B)

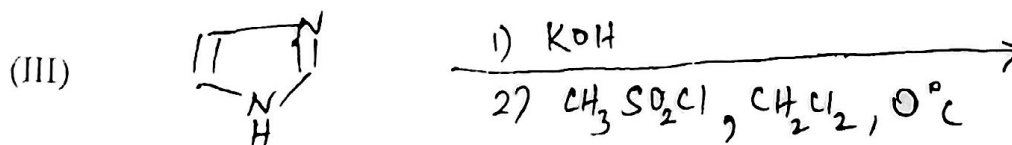
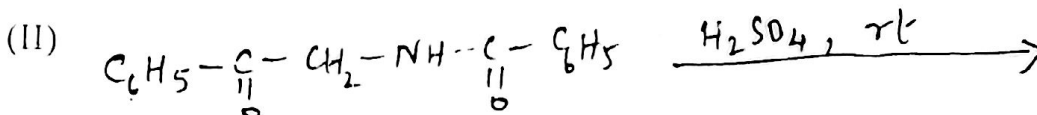
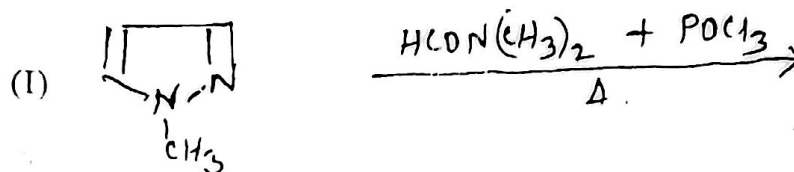




- (iv) (I) Explain why electrophilic attack in 1,2-azoles takes place at 4 - position. 2
 (II) Give the synthesis of pyrazole from an 1,3-diketone. 2

(b) Attempt any one of the following :-

(i) Complete the following reactions :- 4



- (ii) Explain with suitable examples, the reactivity of imidazole with electrophiles. 4

2. (a) Attempt any two of the following :-

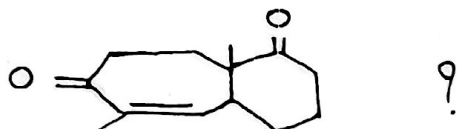
- (i) Discuss the oxidative studies of myo-inositol. 4
 (ii) Explain the structural features & applications of 4
 (I) cellulose (II) heparin 4
 (iii) (I) What are flavones? 1
 (II) Draw the structure of β -carotene & give reactions to prove 3
 (A) the presence of two β -ionone units.
 (B) the presence of conjugated double bonds.
 (iv) Give the synthesis of grandisol from 2-methyl-1,3-butadiene. 4

(b) Attempt any **one** of the following :-

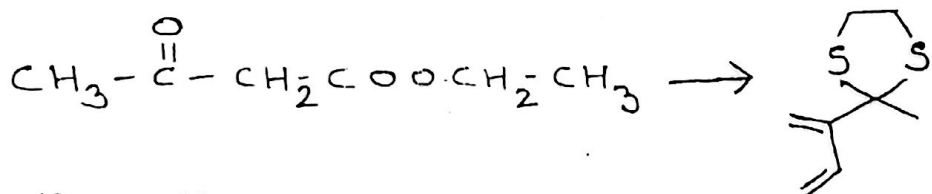
- (i) Give analytical evidences to prove the presence of the following in papaverine. 4
 (I) Four methoxy groups
 (II) Active methylene group
 (III) isoquinoline unit.
 Also draw structure of papaverine & show the reactions.
- (ii) Explain the structural features & biological importance of :- 4
 (I) porphyrins
 (II) anthocyanins.

3. (a) Attempt any **two** of the following :-

- (i) How is Longifolene synthesised from 4



- (ii) How is Griseofulvin synthesised from phloroglucinol? 4
 (iii) Give the synthetic strategy for the synthesis of reserpine. 4
 Outline the steps involved in the following conversion as part of 4 - demethoxydaunomycin :



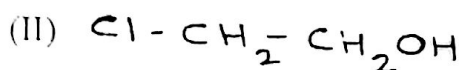
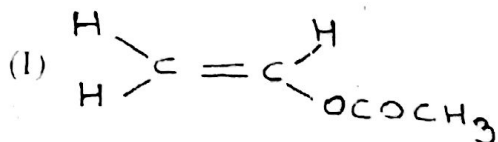
- (iv) How would you convert 6 - methoxytryptamine and cyclohexanecarboxaldehyde derivative into reserpine? 4

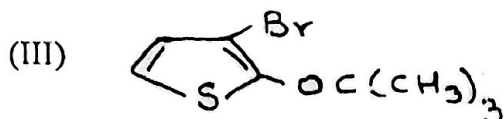
(b) Attempt any **one** of the following :-

- (i) Write the structure of 4 - demethoxydaunomycin. 4
 What are prostaglandins? Give their classification and partial structures.
- (ii) Give the analytical evidence for the structure determination of PGE₁. 4

4. (a) Attempt any **two** of the following :-

- (i) What are Lanthanide shift reagents? How are they useful in simplification of complex NMR spectra? 4
- (ii) Using Pople's spin system notation designate the type of spin system in the following compounds :- 4





- (iii) An organic compound having molecular formula C_4H_9NO exhibits the following spectral data. Assign a suitable structure and justify. 4

IR (cm^{-1}) : 3500 (m), 3402 (m), 2960 (w), 1682 (s), 1610(s), 1398 (m), 1372 (m)

1H NMR δ (ppm) : 1.0 (6H, d), 2.1 (1H, septet), 8.1 (2H, broad, s) (exchangeable with D_2O).

- (iv) Two organic compounds [A] and [B] having molecular formula $C_4H_8O_2$ exhibit strong absorption at $1742cm^{-1}$ in their IR spectra. Their 1H NMR data is as follows : 4

Compound [A] δ (ppm) : 1.2 (3H, t), 2.0 (3H, s), 4.1 (2H, q)

Compound [B] δ (ppm) : 0.8 (3 H, t), 2.0 (2H, q), 3.4 (3H, s)

Deduce the structures for compound [A] and [B] with justification.

- (b) Attempt any **one** of the following :-

- (i) Explain the principle of FT-IR spectroscopy. 4

Discuss the application of ^{31}P NMR Spectroscopy.

- (ii) Explain in brief ^{19}F NMR Spectroscopy. 4

How would you distinguish between cyclopentanone and cyclohexanone by IR spectroscopy?

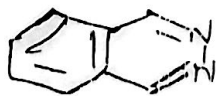
5. Attempt any **four** of the following :-

- (a) Name the following compound by 3

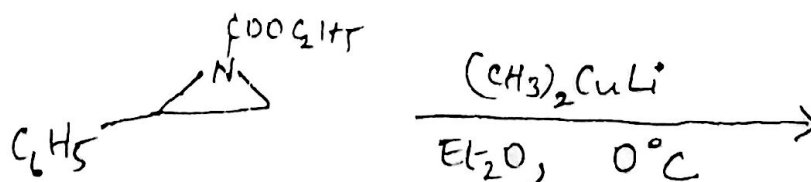
(i) recognised common name.

(ii) systematic Hantzsch - Widman system.

(iii) replacement nomenclature.



- (b) (i) Complete the following reaction :- 1



- (ii) Explain the use of C-metallation in the reactions of benzo-1, 3- azoles with electrophilic reagents. 2

- (c) Write a note on deoxysugars. 3
 Draw the structure of conine. 3
- (d) Give the synthesis of ubiquinone from 3, 4, 5- trimethoxyacetophenone. 3
- (e) Draw the structure of JH₂.
 Give a brief account of aryl acetic acids as plant growth regulators. 3
- (f) What are insect growth regulators?
 Write the structural features of gibberelic acids. 3
- (g) In the following compounds state whether the type of protons indicated by arrows in each CH₂ group are homotopic/enantiotopic/diastereotopic 3
- (I) $\text{CH}_3 - \underset{\uparrow}{\text{CH}_2} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ (II) $\text{CH}_3 - \text{CH}_2 - \underset{\uparrow}{\text{CH}_2} - \text{CH}_2 - \text{CH}_3$
- (III) $\text{CH}_3 - \text{CH}(\text{Br}) - \underset{\uparrow}{\text{CH}_2} - \text{CH}_2 - \text{CH}_3$ 3
- (h) Discuss in brief :- Long range coupling.