

Con. 2230-13.

BS-6119

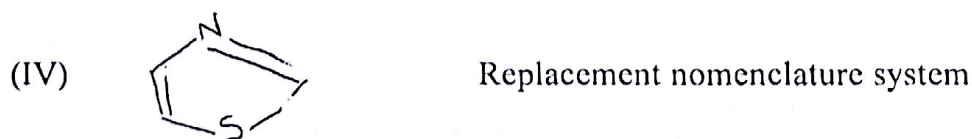
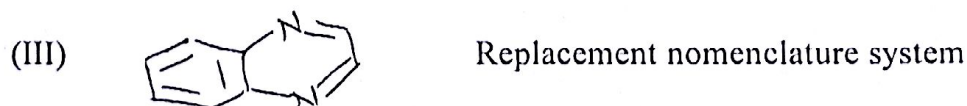
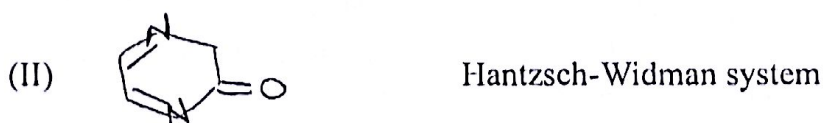
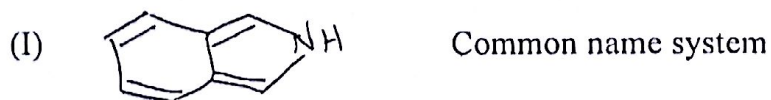
(2½ Hours)

[ 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



(ii) Draw structures for the following :— 4

(I) 2H-pyran

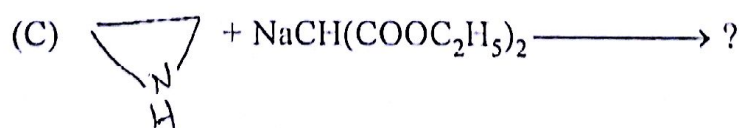
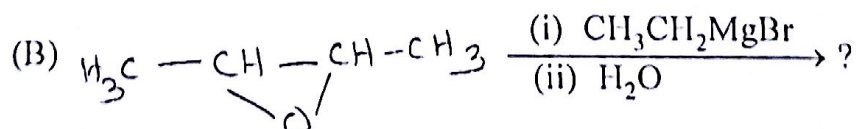
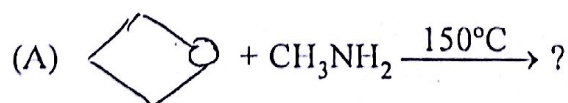
(II) benzo [b] pyridine

(III) 1, 4-dithiacyclohexa-2, 5-diene

(IV) 2-methylazete

(iii) (I) What are azetidines ? 4

(II) Complete the following reactions :—



(iv) Give the preparation of isoxazoles from diketones. Discuss the thermal conversion of isoxazoles to oxazoles. 4

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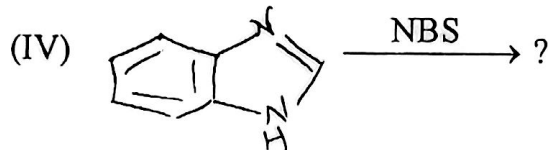
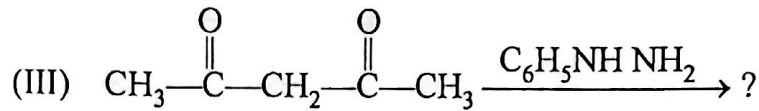
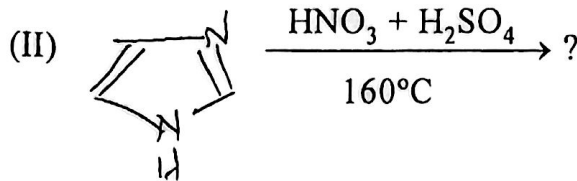
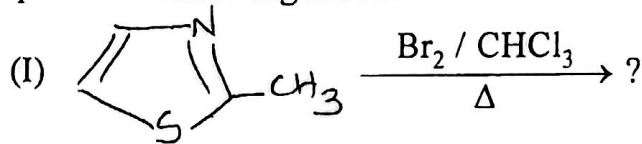
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(b) Attempt any **one** of the following :—

4

(i) Complete the following reactions :—



(ii) Explain why electrophilic attack in 1,2 -azoles takes place at position 4. 4

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

(i) Explain the structural features and applications of chitin and heparin. 4

(ii) How are methylation studies useful in the structure elucidation of lactose ? 4

(iii) How do you determine that  $\beta$ -carotene contains eleven double bonds and two rings ? Write the structure of  $\beta$ -carotene. 4

(iv) Give the synthesis of bombykol from acetylene. 4

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

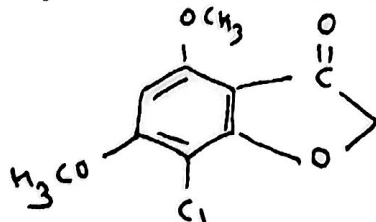
(i) (I) What are insect pheromones ? 2

(II) Give the occurrence and physiological importance of morphine and coniine. 2

(ii) Give the structural features, occurrence and biological importance of anthocyanins. 4

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

(i) Write the synthesis of Griseofulvin from the following compound :— 4

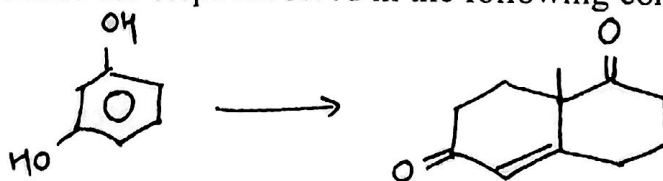


(ii) Write the synthesis of triacontanol. 4

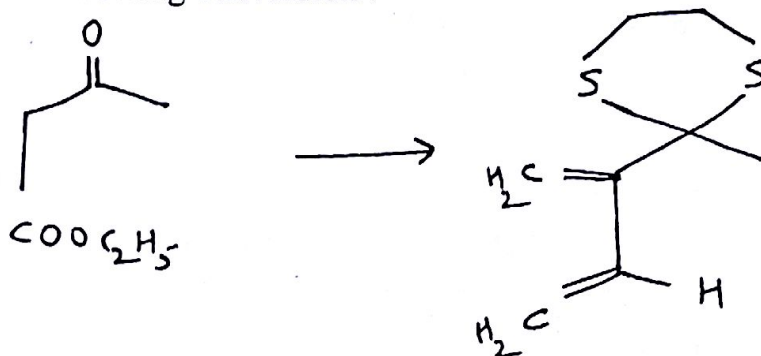
(iii) Answer the following :— 4

(I) Explain the synthetic strategy for the synthesis of Longifolene.

(II) Outline the steps involved in the following conversion :—

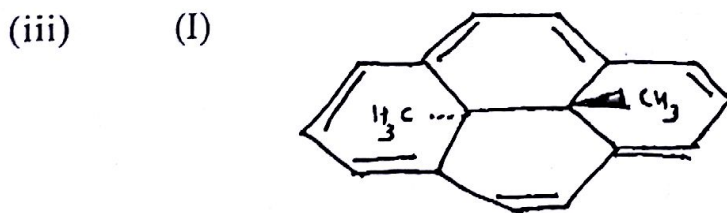
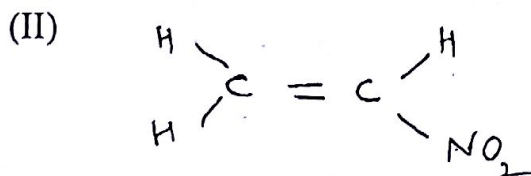
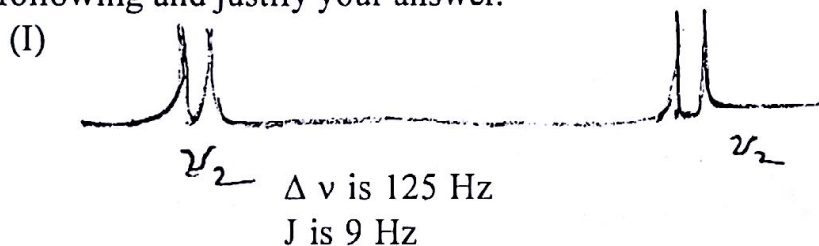


- (iv) Write the analytical evidence for structure elucidation of PGE<sub>1</sub>. 4
- (b) Attempt any one of the following :—
- (i) Write the structure of 4-demethoxy daunomycin. Outline the steps involved in the following conversion :— 4



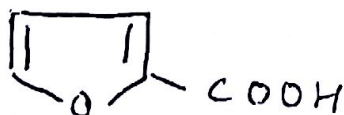
- (ii) (I) State the biological importance of prostaglandins. 4
- (II) Give a brief account of arylacetic acids as plant growth regulators.

4. (a) Attempt any two of the following :—
- (i) Discuss the principle and applications of FTIR spectroscopy. 4
- (ii) Using Pople's spin system notation designate the type of spin system in the following and justify your answer. 4



In the above compound methyl groups are observed at  $-4.2$  ppm in <sup>1</sup>H NMR spectrum and the ring protons are observed at  $8.14 - 8.64$  ppm. Explain.

- (II) Comment on the number of signals and the expected multiplicity (if any) in <sup>1</sup>H NMR spectrum of —



- (iv) An organic compound having molecular formula  $C_9H_{10}O$ , shows the following spectral data. Assign a suitable structure and justify your answer :— 4

IR $cm^{-1}$	: 3080 (w)
	2980 (m)
	2850 (m)
	1660 (m)
	1600 (m)
	1518 (w)
	1100 (s)
	770 (m)
	690 (m)
$^1H$ NMR $\delta$ (ppm)	: 3.7 (3H, s)
	5.1 (1H, d)
	6.1 (1H, d)
	7.1 — 7.6 (5H, m)

- (b) Answer any one of the following :—

- (i) What are shift reagents ? 4

Discuss in brief the applications of chemical shift reagents in NMR spectroscopy.

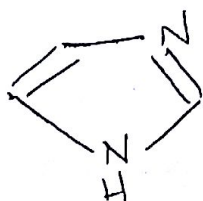
- (ii) An organic compound having molecular formula  $C_4H_5O_2Cl$  exhibits the following spectral data. Assign a suitable structure and justify. 4

IR $cm^{-1}$ :	3100 (m), 2890 (m), 3200–2400 (s and broad)
	1690 (s), 1610 (s), 750 (s)
$^1H$ NMR $\delta$ (ppm)	2.1 [ 3H, d, $J = 1.5$ Hz ]
	6.1 [ 1H, q, $J = 1.5$ Hz ]
	12 [ 1H, s (broad) exchanges with $D_2O$ ]

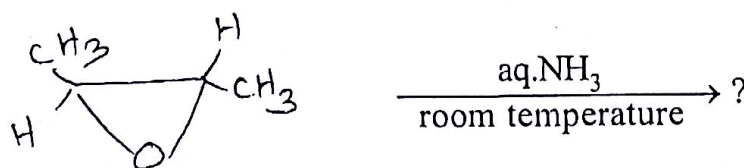
5. Attempt any four of the following :—

- (a) Name the following compound by — 3

- (i) recognized common name  
 (ii) systematic Hantzsch-Widman system  
 (iii) replacement nomenclature



- (b) (i) Write the product formed :— 1



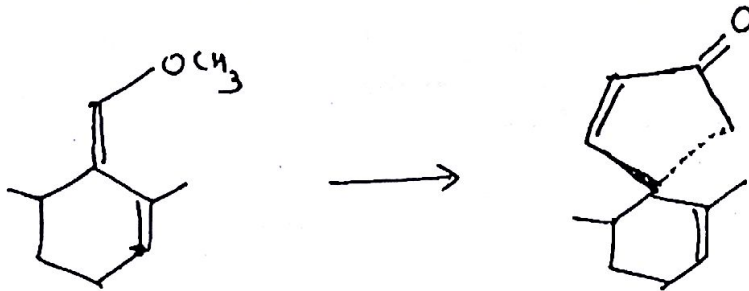
- (ii) Discuss light induced rearrangements of oxazoles. 2



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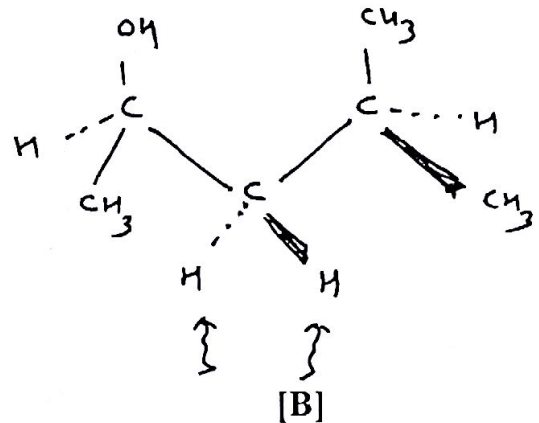
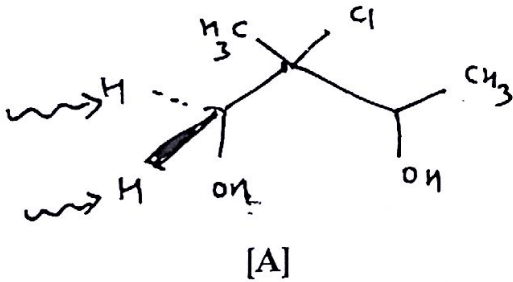
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- (c) (i) Explain the structural features and applications of inositol. 2  
 (ii) Write the structure of papaverine. 1  
 (d) Give the synthesis of ubiquinone from 3, 4, 5 – trimethoxyacetophenone. 3  
 (e) Outline the steps involved in the following conversion :— 3

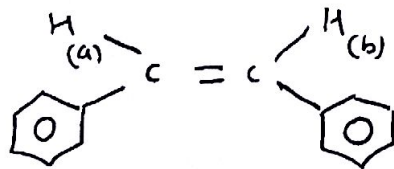
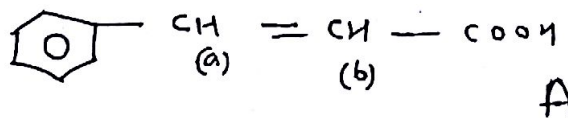


- (f) Draw the structures and give the applications of  $JH_2$  and  $JH_3$ . 3  
 (g) Discuss in brief the applications of  $^{19}F$  and  $^{31}P$  NMR spectroscopy. 3  
 (h) Answer the following :— 3

- (I) State whether the type of protons indicated by arrows are homotopic / enantiotopic / diastereotopic in the following compounds :—



- (II) Predict the splitting pattern for  $H_a$  and  $H_b$  protons in the following :—



- (III) Predict the proton that is shifted far downfield in  $^1H$  NMR spectrum of

