

Q.P. Code : 04695

[Time : 2½ Hours]

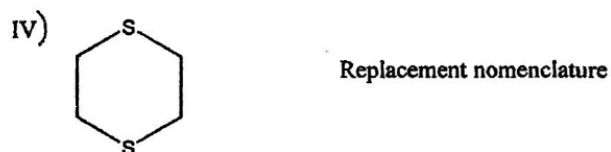
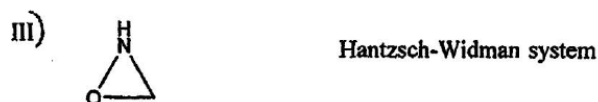
[Marks : 60]

Please check whether you have got the right question paper.

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

Q.1 (a) Attempt **any two** of the following : 08

- i) Name the following compounds according to the system of nomenclature mentioned alongside the structure:-



- ii) Draw structures for the following :

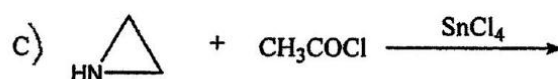
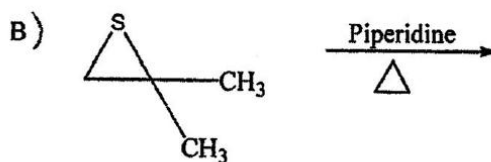
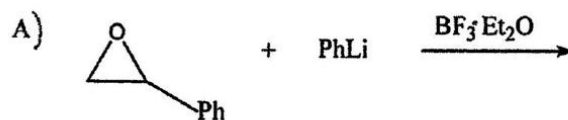
- (I) Pyrano [2,3-c] pyrrole
- (II) 2-azetidinone
- (III) Coumarin
- (IV) 1-thia-2-azacyclopent-2-ene

- iii) (I) Explain : aziridine is a weaker base than azetidine.

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(II) Complete the following reactions :



iv) Give the synthesis of pyrazole from :

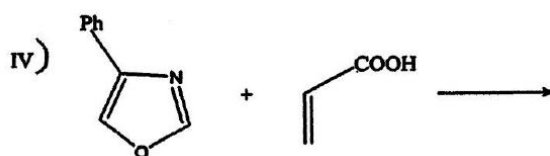
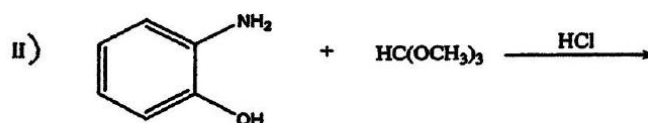
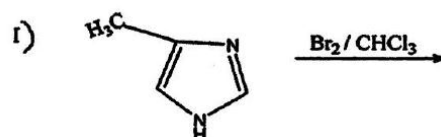
(I) 1, 3-dicarbonyl compound

(II) diazoalkane.

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

04

(i) Complete the following reactions :



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- (ii) (I) Give the synthesis of oxazole from α -acylamino carbonyl compound.
(II) Give two examples of electrophilic substitution of benzimidazole.

Q.2 (a) Attempt **any two** of the following : **08**

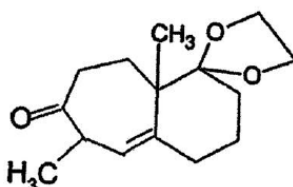
- (i) Discuss the oxidative studies of meso-inositol.
(ii) Explain the structural features and applications of
(I) Cellulose (II) Chitin
(iii) Discuss the structure elucidation of β -carotene.
(iv) Give the synthesis of disparlure from 6-methylhept-1-ene.

(b) Attempt **any one** of the following : **04**

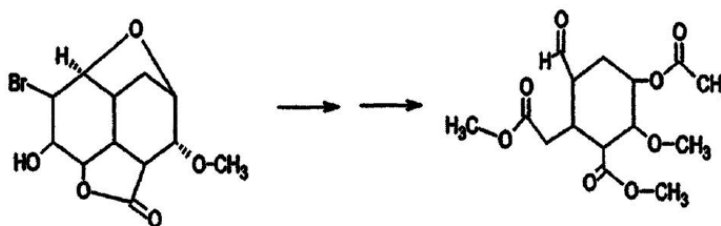
- (i) Give analytical evidences in support of the structure of papaverine.
(ii) Explain structural features and biological importance of :
(I) Porphyrins (II) Quinones

Q.3 (a) Attempt **any two** of the following : **08**

- (i) How is longifolene synthesised from the following compound :



- (ii) In the synthesis of 4-demethoxydaunomycin, how is ethyl acetoacetate converted to 2-(2-methyl-1, 3-dithiolanyl)-1, 3-butadiene? Draw the structure of β -vetivone.
(iii) Outline the steps involved in the following conversion :



Draw the structures of 4-demethoxydaunomycin.

- (iv) How is griseofulvin synthesized from phlorogulcinol?

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(b) Attempt **any one** of the following : 04

- (i) Draw the structure of reserpine.
What are prostaglandins? Write the partial structure of prostaglandins.
- (ii) Write the evidences to establish the structure of PGE₁ (synthesis of PGE₁ is not expected).

Q.4 (a) Attempt **any two** of the following : 08

- (i) What are Lanthanide shift reagents? How are they useful in simplifying the complex NMR spectra?
- (ii) Draw the structures of the following compounds, label the protons and designate the spin system :
- (I) Furan-2-aldehyde
 - (II) 2-chloroethanol
 - (III) p-nitrotoluene
 - (IV) 2-phenoxyethanol
- (iii) An organic compound with molecular formula C₆ H₁₁ O₂ Br shows the following spectral analysis for NMR and infrared spectra. Interpret the given spectral data with possible structure of this compound :
- IR (cm⁻¹) : 1735 and 1250
- ¹H NMR δ (ppm) : 1.25 (3 H, t, J = 7.5 Hz), 1.8 (2H, m)
2.4 (2H, t, J = 7.2 Hz), 3.8 (2H, t, J = 7.2 Hz) and 4.1 (2H, q, J = 7.5 Hz).
- (iv) An organic compound with molecular formula C₆ H₁₀ O₃ with the following spectral data :
- IR (cm⁻¹) : 1725 and 1710
- ¹H NMR δ (ppm) : 1.3 (3H, t), 2.3 (3H, s), 3.5 (2H, q) and 4.2 (2H, s)
- Assign a possible structure and justify.

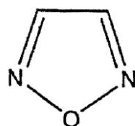
(b) Attempt **any one** of the following : 04

- (i) Explain the principle of FT-IR spectroscopy. How can you distinguish between F P (O) (OH)₂ and F₂ P(O) OH by ³¹P NMR?
- (ii) Explain in brief ¹⁹F NMR spectroscopy.
An organic compound with the molecular formula C₈ H₆ decolourises bromine in carbon tetrachloride and gives a white precipitate with ammonical silver nitrate solution.
IR (cm⁻¹) : 3300 (sharp), 3085-3040 (w), 2110, 760, 690, 650 and 610
Deduce the structure of the compound

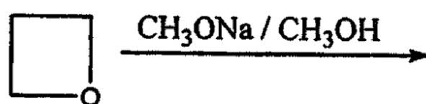
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Q.5 Attempt **any four** of the following :

- (a) Name the following compound by :
 (i) recognized common name
 (ii) systematic Hantzsch-Widman system
 (iii) replacement nomenclature



- (b) (i) Complete the reaction given below :



- (ii) Explain with suitable examples the reactivity of isoxazoles towards electrophiles.
- (c) (i) Write a note on deoxysugars.
 (ii) What are insect pheromones?
- (d) Give the synthesis of ubiquinone.
- (e) Draw the structure of JH₃. Discuss the structural features of triacontanol.
- (f) What are insect growth regulators? Give the applications of gibberellic acid.
- (g) Explain NOE effects with two examples.
- (h) Explain in brief : pulse sequences in FT-NMR spectroscopy.
