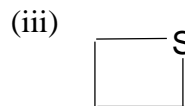
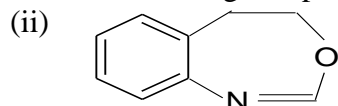
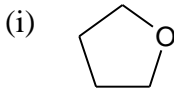


(Time: 3 Hours)

[Total Marks:75]

N.B.: (1) Attempt **All** questions.(2) **Figures** to the **right** indicate **full** marks.1. Answer any **five** of the following:-

(a) Give the IUPAC names of the following compounds: 3



(b) Explain why electrophilic attack on indole takes place at position-3. 3

(c) Explain: random and non- random(or targeted) screening. 3

(d) How was penicillin discovered without a lead? 3

(e) Elaborate on the applications of  $^{31}\text{P}$  NMR spectroscopy? 3

(f) How is NOE useful in NMR spectroscopy? 3

(g) Give the chemical reactivity of  $\text{C}_{60}$ . 3

(h) Enumerate the structural features of fenestranes. 3

2. (a) (i) Give the synthesis of indole by (I) Fischer-Indole synthesis (II) Bischler synthesis. 3

(ii) Explain:- 3

(I) Imidazole is more basic than pyridine.

(II) Position – 1 in isoquinoline is activated much more strongly than position-3 for a nucleophilic attack.

**OR**

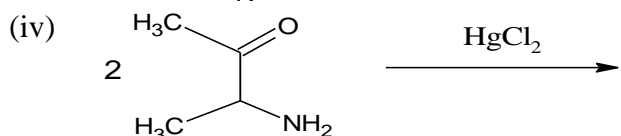
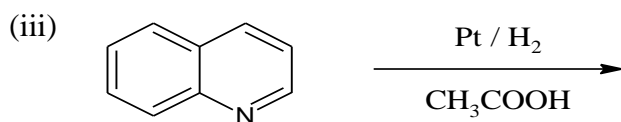
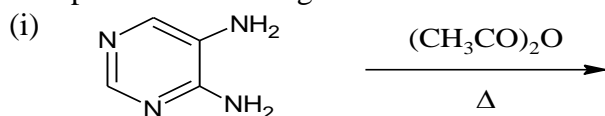
(a) (i) Give two methods of preparation of imidazole. 3

(ii) Explain : Electrophilic attack in 1,2-diazoles takes place at position-4. 3

(b) How is quinoline synthesized by (i) Skraups synthesis (ii) Friedlanders synthesis. 4

**OR**

(b) Complete the following reactions:- 4

(c) How will you prepare isoxazole from 1,3-dicarbonyl compound. 5  
Discuss the reactivity of isoxazoles towards electrophiles.

3. (a) Explain with examples the effect of homologation and chain branching on the potency and therapeutic index of a drug. 6

**OR**

- (a) Explain the split method in the synthesis of tripeptides. 6  
 (b) Explain the term bioisosterism with suitable examples. 4

**OR**

- (b) Give the synthesis of Linezolid. 4  
 (c) Explain the measurement and importance of lipophilicity in drug action. 5

4. (a) Draw a sketch of COSY and HETCOR spectrum for 3-methyl-2-hexanone. 6

**OR**

- (a) Discuss the principle and applications of fluorescence spectroscopy. 6  
 (b) What are Lanthanide shift reagents? How they useful in NMR spectroscopy? 4

**OR**

- (b) Calculate  $^{13}\text{C}$  NMR chemical shift of all the aromatic carbons using the chemical shift correlation table given below, for the following compounds: 4  
 (i) 2-nitrophenol (ii) 4-nitrophenol.

Increments in ppm				
Substitute	<i>ipso</i>	<i>ortho</i>	<i>meta</i>	<i>para</i>
OH	26.6	-12.7	1.6	-7.3
NO <sub>2</sub>	19.6	-5.3	0.9	6.0

- (c) Explain HETCOR technique with a suitable example. 5

5. (a) What are cyclophanes? Give different classes of cyclophanes. 6  
 Write the synthesis cyclophanes by 1,6-Hofmann elimination method.

**OR**

- (a) What are rotaxanes? Discuss their structure and give two synthesis of rotaxanes. 6  
 (b) Explain the phenomenon of photochromism with a suitable example. 4

**OR**

- (b) Write a note on PET based chemo fluoro ionophor metal-ion sensors. 4  
 (c) What are calixarenes? Discuss metal-ion complexation using an example of functionalized calixarene. 5