

**QP Code : 75568**

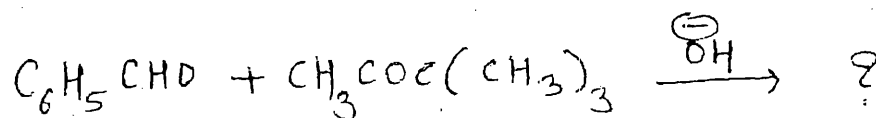
(3 Hours)

[ Total Marks : 75

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

1. Answer any five of the following : 15

- Using a suitable example, explain the mechanism of  $B_{AL}$  ester hydrolysis.
- Give one example each of tri and tetra coordinated sulphur compounds. Comment on the configurational stability of these compounds.
- Explain the mechanism of Favorskii rearrangement.
- Complete and name the following reactions :



- Explain the mechanism of Clemmensen reduction.
- Explain with examples oxidation reactions using periodic acid.
- How will you distinguish between inter and intramolecular H-bonding on the basis of NMR spectroscopy?
- What is the significance of finger print region?

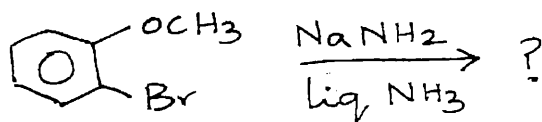
2. (a) Give examples to show the increased stability of carbocations due to inductive and mesomeric effects. Justify. 6

**OR**

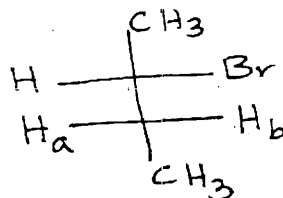
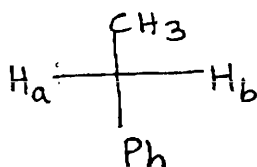
(a) Give reasons :-

- Aromatic amines are less basic than aliphatic amines. 6
- o - Nitrophenol is more acidic than phenol.

(b) Complete the following reaction and give the mechanism :- 5



- (c) What are enantiotopic and diastereotopic ligands? Specify the relationship between  $H_a$  and  $H_b$  in the following two examples :- 4



OR

- (c) Discuss the stereochemistry of ansa compounds. Give two suitable examples to explain its configurational descriptors. 4

3. (a) What is Robinson's annulation? Explain its mechanism. 6

OR

- (a) Give the mechanism and one application of Acyloin condensation. 6

- (b) Explain the mechanism of McMurry coupling reaction. 5

- (c)  $\text{PhCHO} + \text{HCHO} + (\text{CH}_3)_3\text{N}^+\text{H}\cdot\text{Cl}^- \rightarrow ?$  4

Complete and name the above reaction. Give its mechanism.

OR

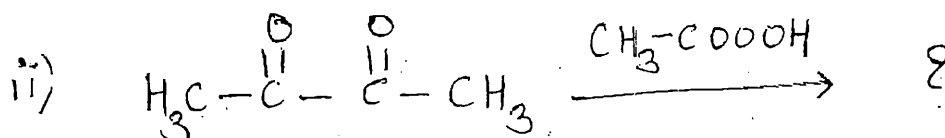
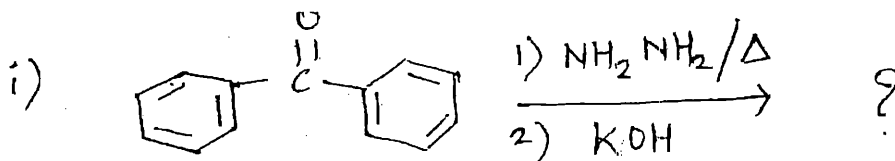
- (c) What is Knoevenagel reaction? Discuss the mechanism of the reaction. 4

4. (a) (i) Give an account of Beckmann rearrangement. 6

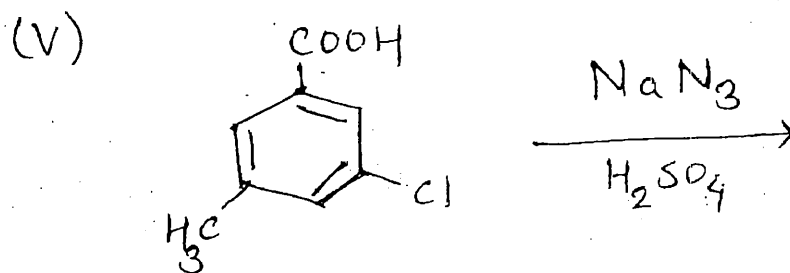
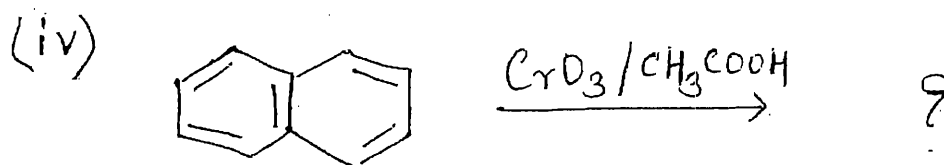
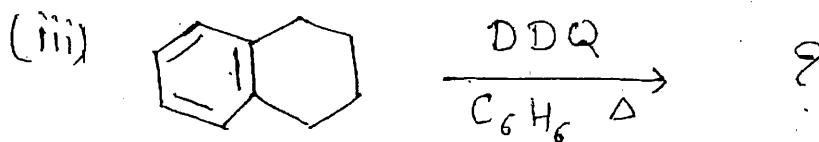
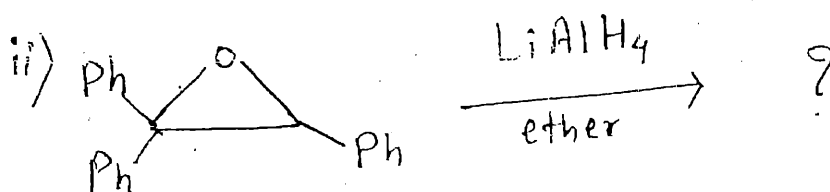
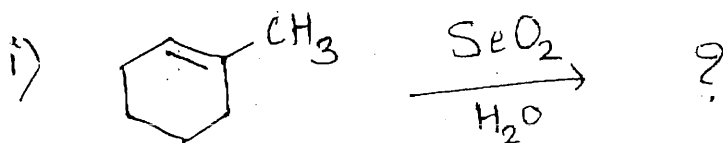
- (ii) Discuss Reimer-Tiemann reaction with suitable mechanism.

OR

- (a) Complete the following reactions and give their mechanism :- 6



(b) Complete the following reactions :-



4

(c) Give one example of each of the following reactions :-

4

- (i) Hofmann rearrangement
- (ii) Schmidt rearrangement
- (iii) Birch reduction
- (iv) Lossen rearrangement

OR

(c) Explain the mechanism of Fries rearrangement and give one application of it.

4

5. (a) What is meant by 'chemical shift' in NMR spectroscopy? Discuss the factors affecting chemical shift.

6

OR

(a) Give fragmentation pattern of the following :-

6

- (i) Benzoic acid
- (ii) Ethyl benzene

(b) An organic compound having molecular formula  $C_4H_5NO_2$  shows following spectral data :-

5

IR ( $cm^{-1}$ ) : 2250 (m), 1740 (s)

PMR ( $\delta$  ppm) : 3.8 (3H, singlet), 3.5 (2H, singlet)

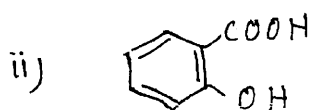
Mass spectrum (m/z) : 99, 73, 59

Deduce the structure of the compound.

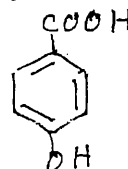
(c) How will you distinguish between following pairs of compounds on the basis of IR spectroscopy?

4

i)  $CH_3-CH_2-CHO$  and  $CH_3-CO-CH_3$



and



OR

(c) (i) Calculate  $\lambda_{max}$  for the following :

4

