

**CHUKA UNIVERSITY EXAMINATIONS (2020/2021)**

**CHEM 332: ORGANIC CHEMISTRY III**

**STREAMS: BSc (CHEM) and Bed (SCI)**

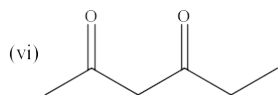
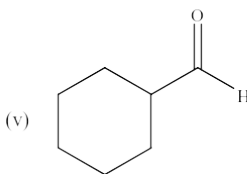
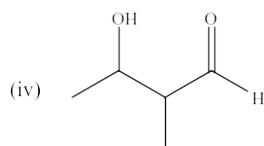
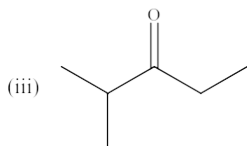
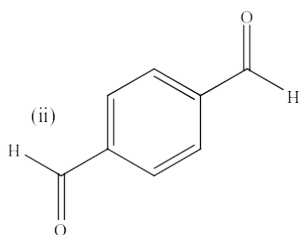
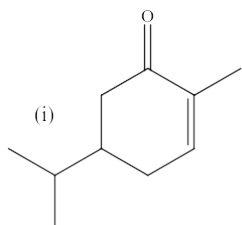
**TIME: 2 HRS**

**Instructions**

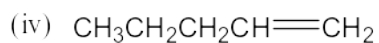
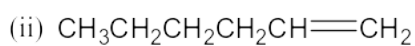
Answer question One (Compulsory) and any other Two questions

**QUESTION ONE [30 MARKS]**

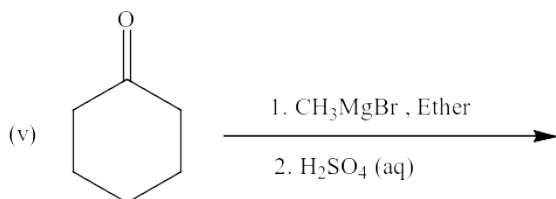
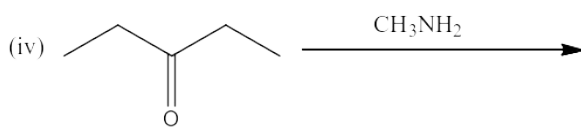
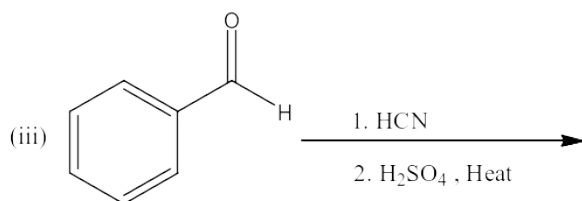
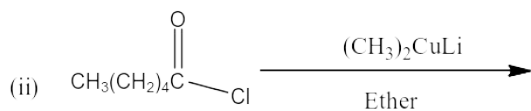
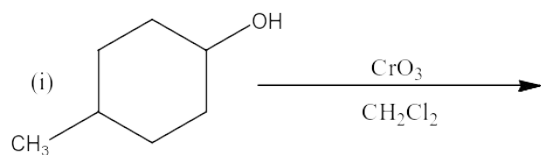
(a) Write the IUPAC name of each of the following organic compounds (**6 marks**)



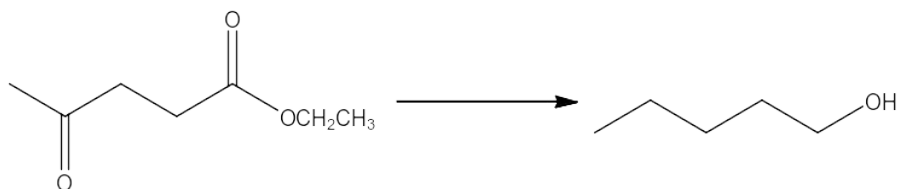
(b) Write equations for synthesis of pentanal from each of the following starting materials (**4 marks**)



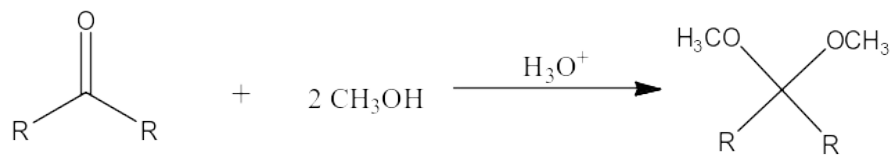
(c) Write the structure of the major organic product(s) of each of the following reactions (5 marks)



(d) Design a plausible stepwise method of effecting the following transformation (3 marks)



(e) Write a detailed mechanism for the following reaction (7 marks)



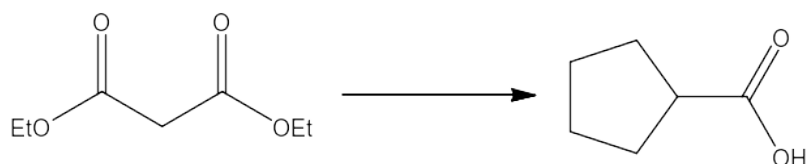
observations:

(f) Explain the following

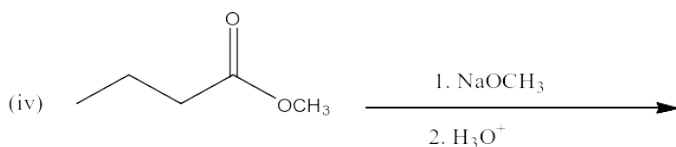
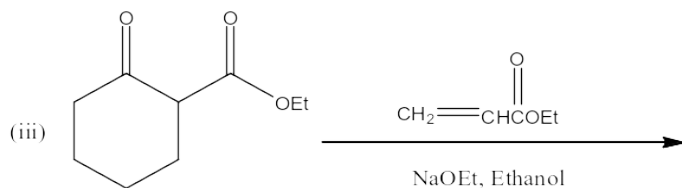
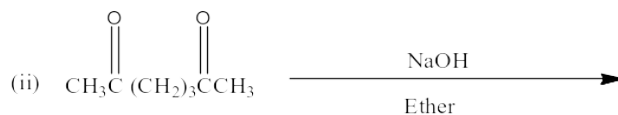
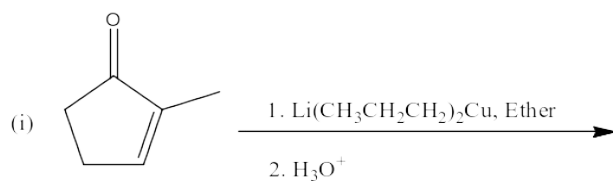
- (i) Amides are far less basic than amines (**2 marks**)
- (ii) Aromatic amines are weaker bases than the corresponding non-aromatic amines (**2 marks**)
- (iii) Ketones have higher boiling points than alkanes of similar molecular weights (**1 mark**)

**QUESTION TWO [20 MARKS]**

(a) Give the reagent(s) and condition(s) that can be used to effect the following transformation (**5 marks**)

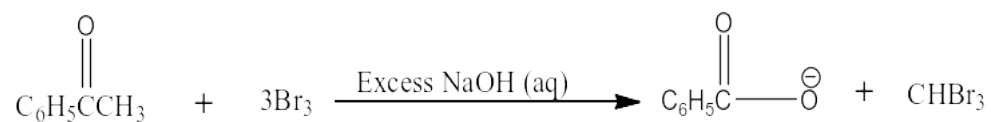


(b) Write the structure of the major organic product(s) of each of the following reactions (**5 marks**)



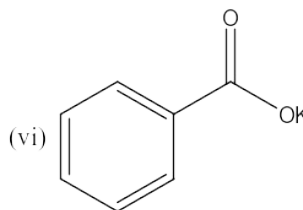
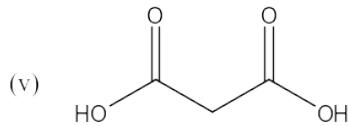
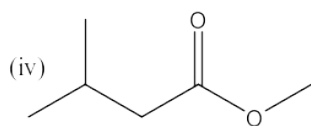
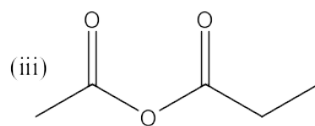
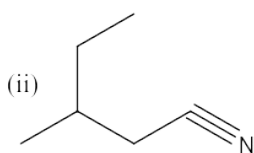
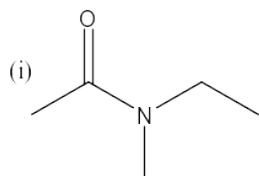
(c) Discuss the physical properties of carboxylic acids and their derivatives (**6 marks**)

(d) Write the stepwise mechanism of the following reaction (4 marks)



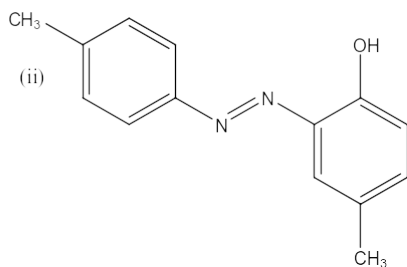
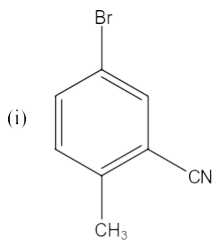
**QUESTION THREE [20 MARKS]**

(a) Write the name of each of the following organic compounds (6 marks)



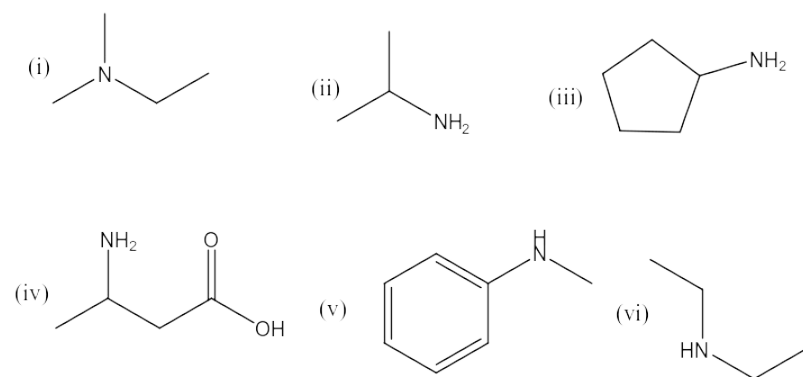
(b) Describe, with the aid of suitable examples, four methods that can be used for laboratory preparation of amines (8 marks)

(c) Design a plausible synthesis of each of the following compounds using diazonium salts as intermediates starting with benzene or toluene (6 marks)

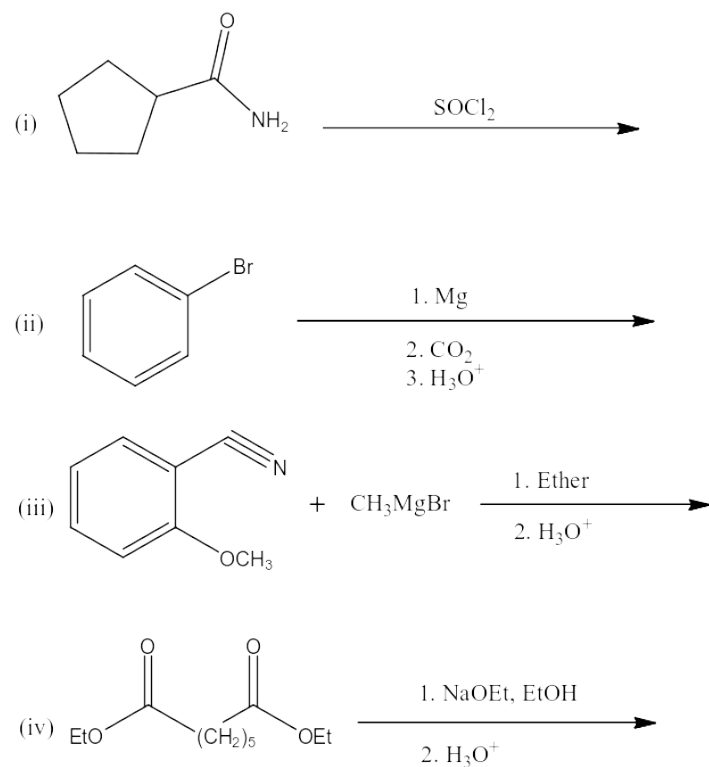


**QUESTION FOUR [20 MARKS]**

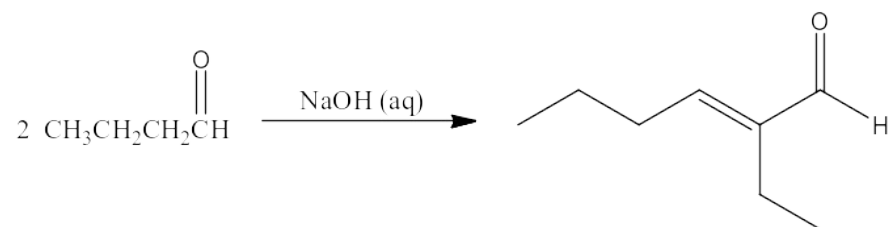
(a) Write the names of the following organic compounds (6 marks)



(b) Write the structure of the major organic product(s) of each of the following reactions (4 marks)



(c) Write the stepwise mechanism of the following reaction (4 marks)



(d) Design plausible a synthetic route to the following compounds (6 marks)

