

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION**

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

CHEM 332: ORGANIC CHEMISTRY III

STREAMS: BSC

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 11/08/2021

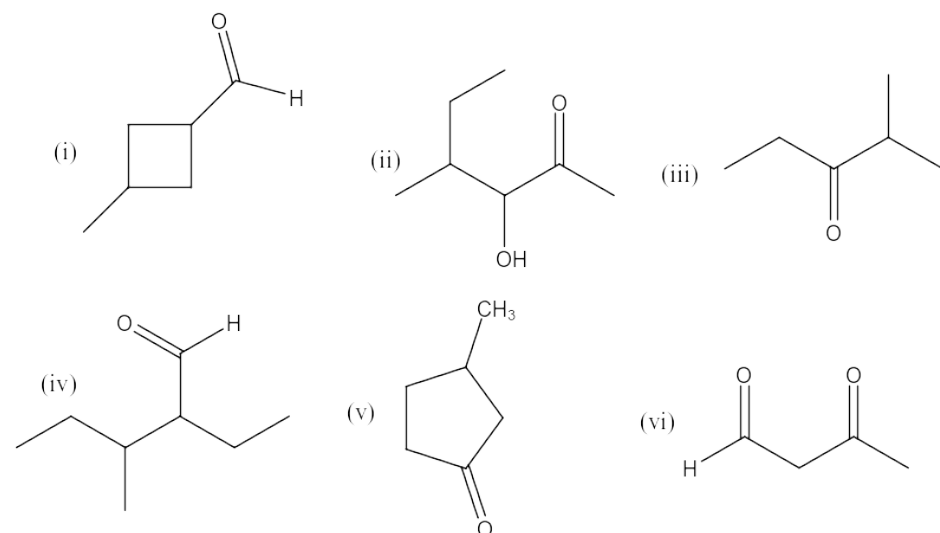
11.30 A.M – 1.30 P.M.

INSTRUCTIONS

- Answer Question ONE and any other TWO Questions

QUESTION ONE [30 MARKS]

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



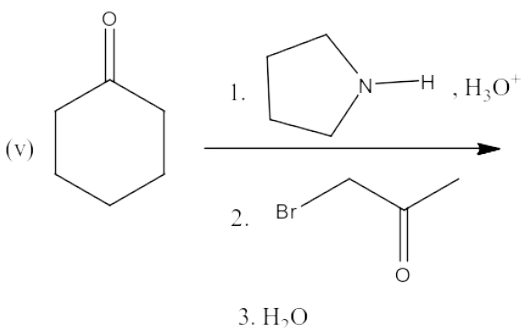
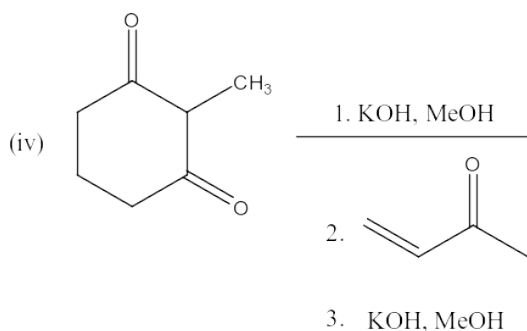
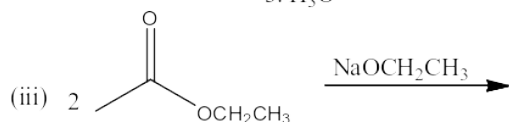
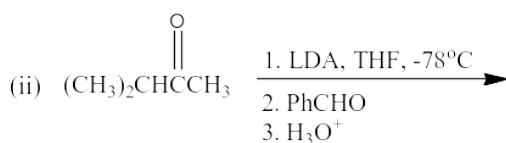
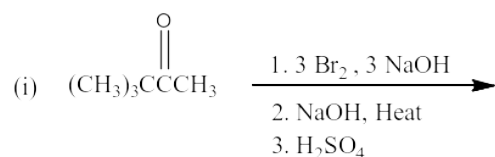
(b) Discuss the physical properties of aldehydes and ketones **(2 marks)**

(c) Draw the structure of the major organic product(s) of the reaction of butanal with each of the following reagents **(6 marks)**

(i) LiAlH_4 in ether, then H_3O^+ (ii) CH_3MgI , ether, then H_3O^+ (iii) CH_3OH (excess), H_2SO_4 (trace)

(iv) $\text{Na}_2\text{Cr}_2\text{O}_7$ in H_2SO_4 (v) (d) NaCN , HCN (vi) $\text{CH}_3\text{CH}_2\text{NH}_2$

(d) Write structure of the major organic product(s) of each of the following reactions **(10 marks)**



(e) Write the stepwise mechanism of the following reaction **(6 marks)**

QUESTION TWO [20 MARKS]

(a) Draw the structure corresponding to each of the following names **(6 marks)**

(i) N-Ethyl-N-methylbutanamide (ii)

2,4-Dimethylpentanoyl chloride

(iii) Hexanedioic acid (iv)

Ethanoic propanoic anhydride

(v) Cyclopentanecarboxylic acid (vi) 5-

Oxo-4-propylhexanoic acid

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

(c) Write the major organic product(s), if any,

of the reaction of propanoyl chloride each of the following reagents

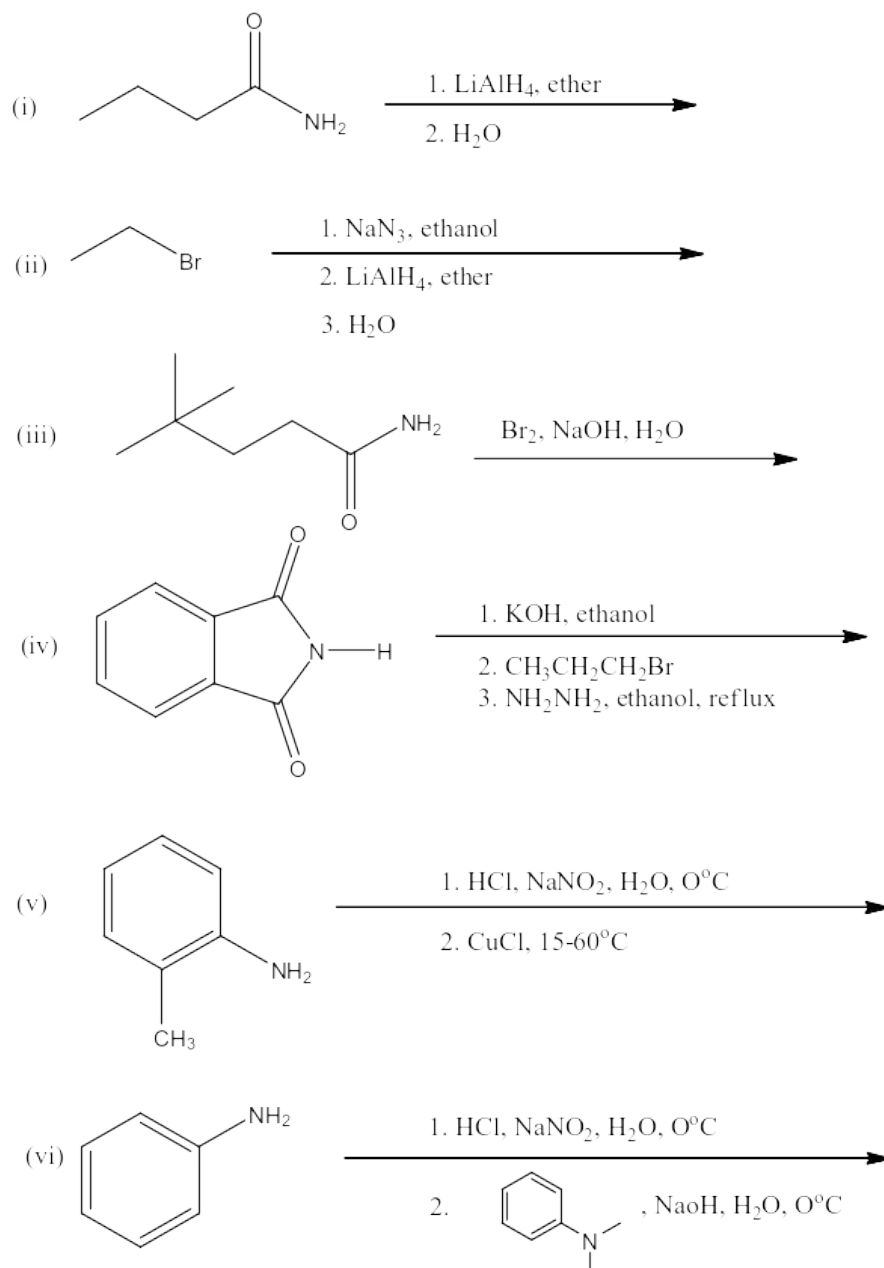
(8 marks)

(i) CH_3MgBr , then H_3O^+ (ii) $\text{CH}_3\text{CO}_2\text{Na}$ (iii) Ethanol (iv) $(\text{CH}_3)_2\text{HN}$

QUESTION THREE [20 MARKS]

(a) Discuss the physical properties of carboxylic acids and their derivatives (8 marks)

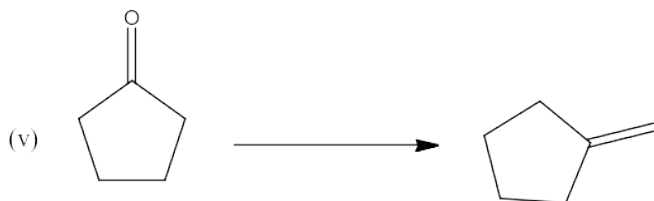
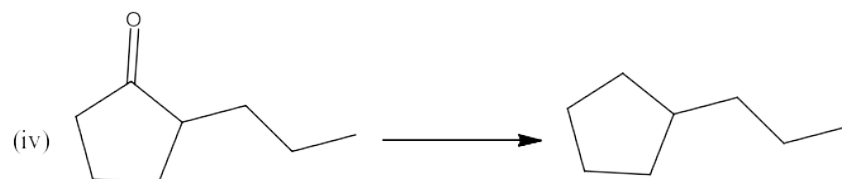
(b) Draw the structure of the major organic product(s) of each of the following reactions (12 marks)

**QUESTION FOUR [20 MARKS]**

(a) Write equations for synthesis of pentanal from the following starting materials (4 marks)

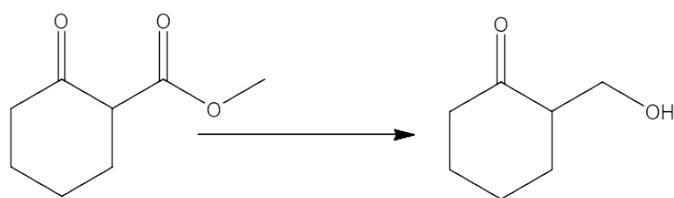


(b) Identify the reagents that can be used to effect the following transformations (5 marks)



(c) Design a plausible stepwise synthesis of the following

(3 marks)



(d) Write the stepwise mechanism of the following reaction

(8 marks)

