

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATION**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF
CHEM 332: ORGANIC CHEMISTRY III**

STREAMS:

TIME: 2 HOURS

DAY/DATE: THURSDAY 04/02/2021

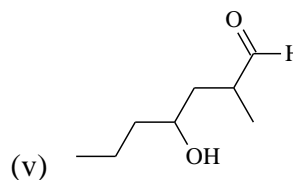
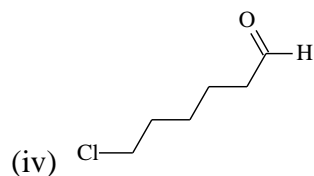
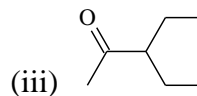
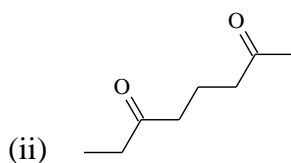
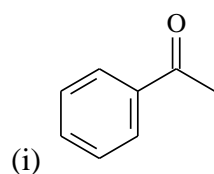
11.30 A.M – 1.30 P.M.

INSTRUCTIONS

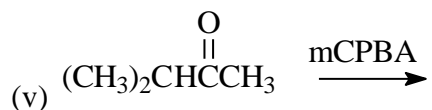
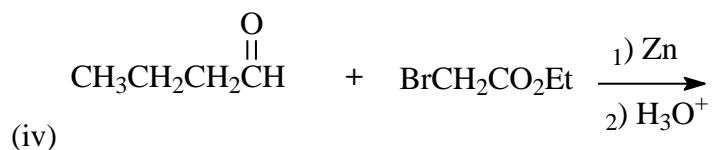
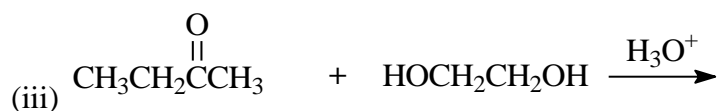
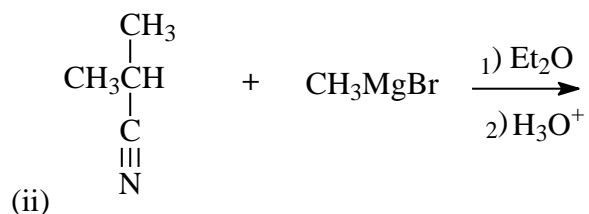
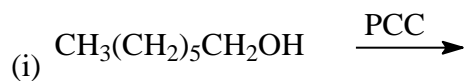
- Answer Question ONE and Any Other TWO Questions.

QUESTION ONE [30 MARKS](a) Draw the structures corresponding to the following IUPAC names [5 Marks]

- (i) Hexan-2-one (ii) 4-Methylpentanal (iii) 2-Ethyl-3-hydroxyhexanal
(iv) Cyclohexanecarbaldehyde (v) Pent-4-en-2-one

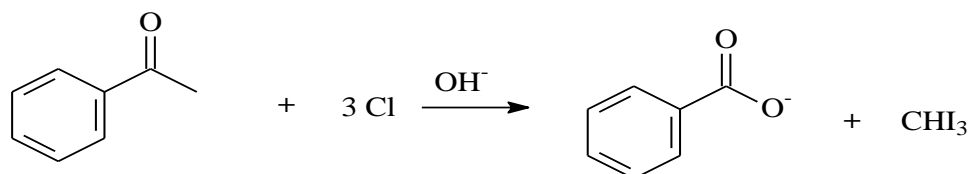
(b) Give the IUPAC names corresponding to the following compounds [5 Marks]

(c) Write the major organic product(s) of each of the following reactions [5 Marks]

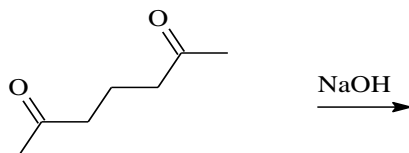


(d) Write a plausible mechanism for the following reaction

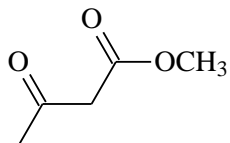
[5 Marks]



(e) Draw the structure of the aldol condensation product for the following diketone [2 Marks]



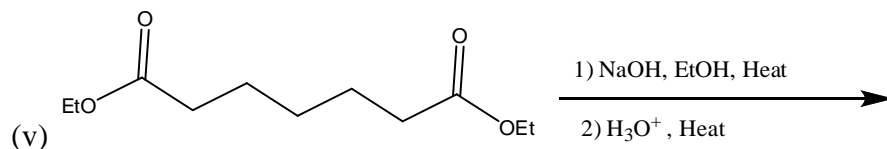
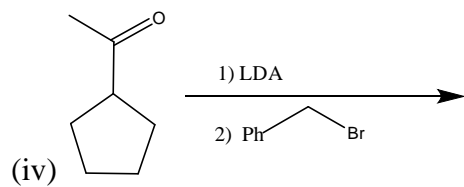
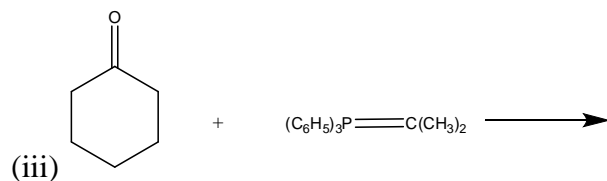
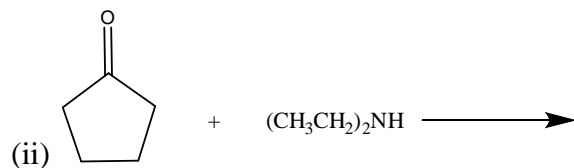
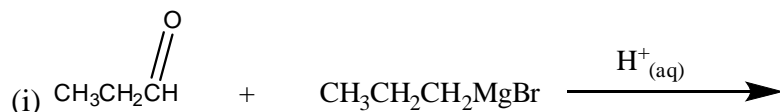
(f) Draw the structure expected from the Claisen condensation of the following ester [2 Marks]



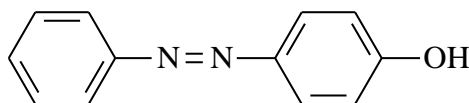
(g) Discuss the physical properties of aldehydes and ketones (6 Marks)

QUESTION TWO [20 MARKS]

(a) Write the major organic product(s) of each of the following reactions [10 Marks]



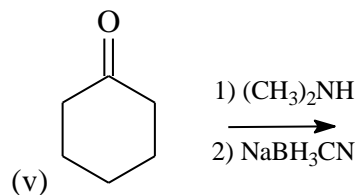
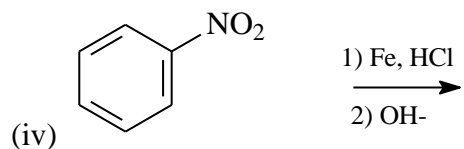
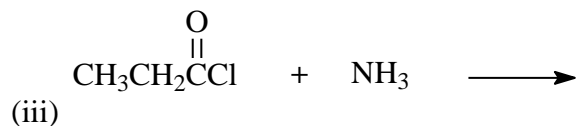
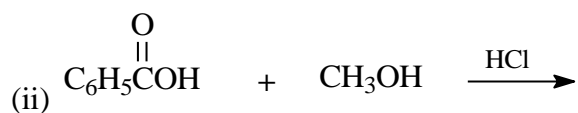
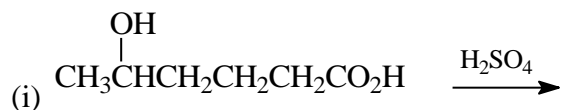
(b) Outline the stepwise synthesis of *p*-(phenylazo) phenol from benzene, phenol and any other reagents of your choice [10 Marks]



p-(phenylazo) phenol

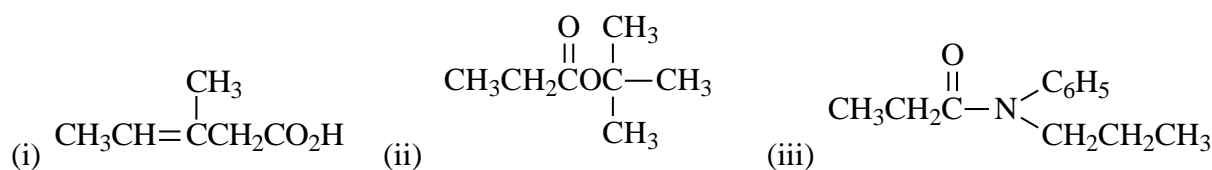
QUESTION THREE [20 MARKS]

(a) Write the major organic product(s) of each of the following reactions [10 Marks]

(b) Draw the product formed when pentanoyl chloride ($\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COCl}$) is treated with each of the following reagent(s) (10 Marks)(i) H_2O , pyridine(ii) $\text{CH}_3\text{CH}_2\text{OH}$, pyridine(iii) CH_3COO^- (excess)(iv) NH_3 (excess)(v) $(\text{CH}_3\text{CH}_2)_2\text{NH}$

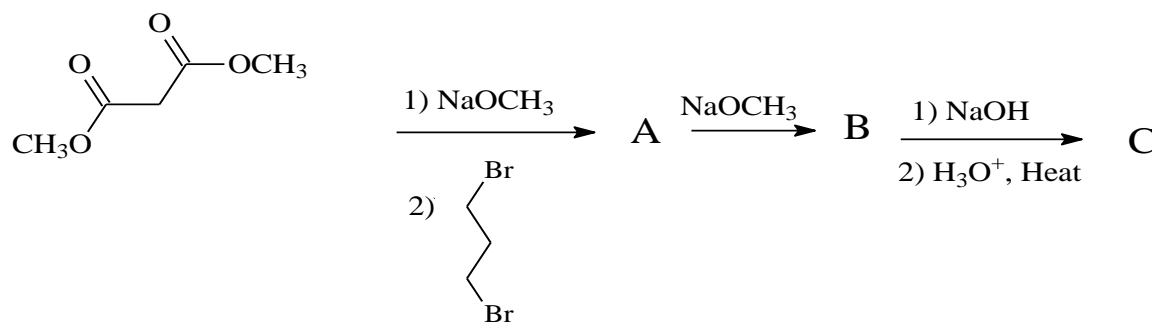
QUESTION FOUR [20 MARKS]

(a) Write the IUPAC name of each of the following organic compounds [5 Marks]



(b) Discuss the physical properties of carboxylic acids and their derivatives (5 Marks)

(c) Give the structures of products A, B, and C in the reaction below [6 Marks]



(d) Write the structure of each of the following organic compounds (4 Marks)

- (i) N,N-dimethylpentanamide (ii) 3-bromohexanenitrile
 (iii) 3-methylbutanoyl chloride (iv) N-methylpropan-2-amine
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