NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science

JULY 2017 Examination

COURSE TITLE: Organic Chemistry III

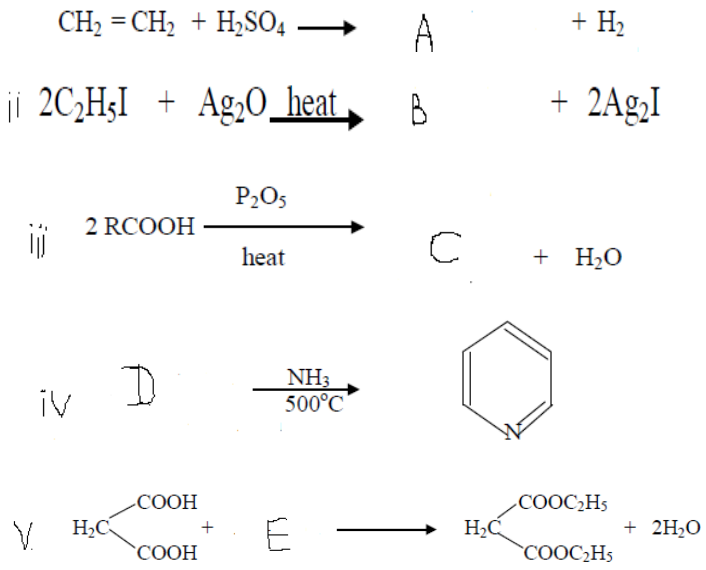
COURSE CODE: CHM 305

COURSE UNIT: 3 Units

INSTRUCTION: Answer question ONE and any other FOUR questions

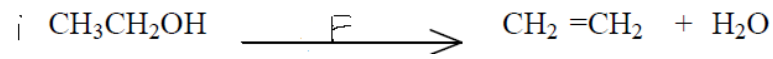
TIME: 2 ½ Hours

1a) Give the structure and name of the reactant or product that is represented by each of the alphabet in the below equations.



(2 marks each = 10 marks)

1b) Give the reaction conditions for the below reactions to be feasible.



ii) $CH_3CHO \xrightarrow{[O]} CH_3COOH$

iii) $RCONH_2 \xrightarrow{H} RCOOH + NH_4^+$

iv) $\begin{matrix} R \\ R' \end{matrix}\!\!>\!C{=}O + CN^- \rightleftharpoons R{-}\underset{\displaystyle CN}{\overset{\displaystyle O^-}{C}}{-}R' \xrightarrow{H^+} R{-}\underset{\displaystyle CN}{\overset{\displaystyle OH}{C}}{-}R'$

(1 mark each = 4 marks)

1c) Discuss the reactions of Amino acids in relation to their behaviour as an acid or a base. (8 marks)

2a) With respect to primary, secondary and tertiary alcohols, discuss chlorination. (5 marks)

2b) Explain Esterification reaction. (5 marks)

2c) State Saytzeff's rule and explain it in relation to dehydration of butan-2-ol. (2 marks)

3a) Define metamerism and give two examples. (3 marks)

3b) Discuss the formation of Oxonium salts. (5 marks)

3c) Explain the Miscellaneous reactions of ethers. (4 marks)

4a) Discuss the acidic properties of carboxylic acids. (8 marks)

4b) Write briefly on oxidation of Methanoic Acid. (4 marks)

5a) Explain Hofmann Degradation. (4 marks)

5b) Discuss the Oxidative cleavage of alkanes. (8 marks)

6a) Write on the following

I. Resonance structure of Pyrrole. (2 marks)
II. Physical properties of pyrrole. (2 ½ marks)
III. Reactions of pyrrole. (3 ½ marks)

6b) Give the similarity between Pyrrole and Aniline. (4 marks)