



# Technical University of Mombasa

*Faculty of Applied and Health Sciences*

DEPARTMENT OF PURE AND APPLIED SCIENCES

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

(DSL12J)

## **ACH 2205: ORGANIC CHEMISTRY II**

**SPECIAL/SUPPLEMENTARY: EXAMINATIONS**

**SERIES: JULY 2013**

**TIME: 2 HOURS**

### **INSTRUCTIONS:**

You should have the following for this paper

- *Answer booklet*

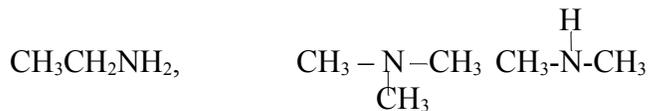
This paper consists of **FIVE** questions.

Answer Question **ONE (compulsory)** and any other **TWO** questions

*This paper consists of 4 PRINTED pages*

## Question ONE

(a) Discuss the solubility of the following amines in water.



(6marks)

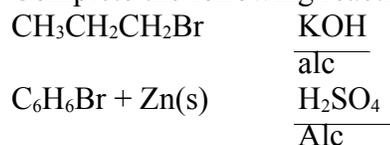
(b) Which of the above amines will have highest and lowest boiling point and why. (4marks)

(c) One method that is used for preparation of amines is reduction of nitro compounds like R-NO<sub>2</sub>.

(i) Use FOUR ways to define a reduction process. (4marks)

(ii) State reducing agent and the catalyst that is used in the above process. (2marks)

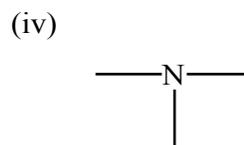
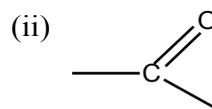
(d) (i) Complete the following reactions and name the products



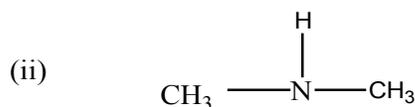
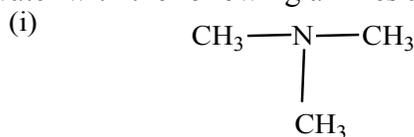
(ii) What type of reactions are they

(4marks)

(e) Identify the compounds that have the following functional groups.



(f) Write equations for reaction of water with the following amines and name the products.



(g) What would be the effect of the above products on

- Litmus paper
- A base

(2marks)

## Question TWO

- a) Give a reason why amines pharmaceutical products. **(4marks)**
- b) Write equation for reaction of an amine salt with a strong base. **(2marks)**
- c) Water can act as an acid and as a base according to Brownsted Lowry theory
- i) Define an acid and a base using this theory **(4marks)**
- ii) Write equations to show that water is an acid and is a base according to this theory **(4marks)**
- d) Discuss the effect of adding acidified  $\text{KMO}_4$  to  $1^\circ$   $2^\circ$  and  $3^\circ$  alcohols use equation to support your answer. **(6marks)**

### Question THREE

- a) Give THREE examples of compounds that form H-bonding and indicate the type of polar group they have **(6marks)**
- b) Identify the two polar groups that are found in carboxylic acids **(2marks)**
- c) Using an equation show the addition of a nucleophile HCN onto an  $\text{CH}_3\text{CHO}$  and name the product. **(4marks)**
- d) Discuss the solubility of the following compounds in water.
- i)  $\text{CH}_3\text{CH}_2\text{OH}$
- ii)  $\text{CH}_3\text{CH}_2\text{NH}_2$
- iii)  $\text{CH}_3\text{CHO}$  **(6marks)**
- e) Which of the above compounds will have
- i) Highest boiling point.
- ii) Lowest boiling point and why? **(2marks)**

### Question FOUR

- a) Explain why carboxylic acids have high Bpts than corresponding alcohol with same number of carbons. **(5marks)**
- b) Write equation for oxidation of
- i) Methanoic acid
- ii) Ethanedioic acid **(4marks)**
- c) Explain why carboxylic acids are stronger acids than alcohols according to Brownsted Lowry theory of acids and bases **(5marks)**
- d) Carboxylic acids are used in the industrial manufacture of nylons.
- i) Give an equation for formation of nylon 6,6 from its ingredients. **(4marks)**
- ii) State the type of polymerization process that is used during nylon 6,6 manufacture. **(2marks)**

### Question FIVE

- a) State two uses of mono carboxylic acids **(3marks)**
- b) Why primary amines stronger are base than Ammonia. **(3marks)**
- c) Giving a suitable reason arrange the following Amines in order of basic strength  
 $\text{NH}_3$ ,  $\text{CH}_3\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}_2$ ,  $(\text{CH}_3\text{CH}_2)_2\text{NH}$   
 $\text{CH}_3\text{CH}_2\text{NH}_2$                        $\text{CH}_3\text{CHBrNH}_2$  **(10marks)**
- d) Suggest a reason why phenyl amines are weaker base than aliphatic amines. **(4marks)**