UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMMES: BACHELOR OF SCIENCE YEAR I IN AGRICULTURAL ECONOMICS AND AGRIBUSINESS MANAGEMENT, ANIMAL SCIENCE, AGRICULTURAL EDUCATION, AGRONOMY, FOOD SCIENCE, NUTRITION AND TECHNOLOGY, HOME ECONOMICS, HOME ECONOMICS EDUCATION, HORTICULTURE, AND TEXTILE AND APPAREL DESIGN MANAGEMENT

COURSE CODE: CP 101

TITLE OF PAPER: CHEMISTRY

Section 1: Inorganic Chemistry
Section 2: Organic Chemistry

TIME ALLOWED: TWO (2) HOURS

INSTRUCTIONS: ANSWER FOUR (4) QUESTIONS WITH AT LEAST TWO (2) QUESTIONS FROM EACH SECTION

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SECTION 1: Inorganic Chemistry

QUESTION 1

Define the following terms: **(Each question carries 5 marks)**

(i) Oxidation
(ii) A weak acid
(iii) Chemistry
(iv) Endothermic reaction
(v) Boiling point

QUESTION 2

You prepared a solution of 0.02 M sodium carbonate as a standard base and you needed 20 ml of it to titrate 10 ml of hydrochloric acid of unknown concentration.

(a) Write a balanced equation for the reaction [8]
(b) Calculate the molarity of the hydrochloric acid [8]
(c) Calculate the mass of each product [9]

Atomic mass Na = 23, C = 12, O = 16, H = 1, Cl = 35.5

QUESTION 3

A solution was made by 200 ml of 1.05 M H_2SO_4, 300 ml of 0.5 M H_2SO_4, 1000 ml of Na_2SO_4 and 500 ml of 0.25 M H_2SO_4. Assuming that the volumes are additive, calculate the molarity of sulphuric acid in the solution. Clearly show all essential steps. [25]

SECTION 2: Organic Chemistry

QUESTION 4

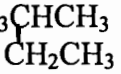
(a) Define or give brief descriptions of the following terms and phrases **(Each question carries 2 marks).**

(i) An essential amino acid
(ii) A meta director
(iii) Halogenation
(iv) Carbonyl carbon
(v) Unsaturated hydrocarbon
(vi) Elimination reaction
(vii) Amines

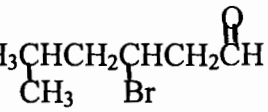
(b) (i) List the basic components of an amino acid **[3]**
(ii) Describe the essential role played by proteins in all biological processes **[8]**

QUESTION 5

(a) Write IUPAC names for the following organic compounds: **(Each question carries one mark)**

(i) 

(ii) 

(iii) 

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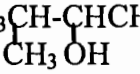
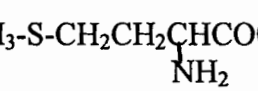
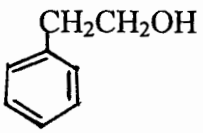
(v) 

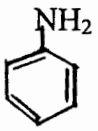
(vi) 

(vii) $CH_3\overset{O}{\overset{\|}{C}}H$

(viii) $CH_3\underset{CH_3}{\underset{|}{C}}HC{=}CCH_2CH_2CH_3$

(ix) $CH_3\underset{CH_3}{\underset{|}{C}}HCH{=}C{=}CH_2$

(x) 

(xi) 

(xii) 

(b) Write condensed structural formulae for each of the following compounds: **(Each question carries 1 mark)**

(i) Meta-bromoanaline
(ii) 3-methyl-1-pentyne
(iii) Propanal
(iv) 2-methyl-2-butanol
(v) 3-bromo-2-pentanone
(vi) 3-methyl-2-butamine
(vii) Cyclohexene
(viii) 3-phenylheptane
(ix) 1,3-dibromobenzene
(x) 1,1-diethylcyclopentane
(xi) 2,3-dinitrotoluene
(xii) Cyclopentanone
(xiii) 2-pentanol

QUESTION 6

Copy and complete the following equations: (Each question carries 2 marks)

(a) CH_3CCH_3 + HCN ----------→

(b) $CH_3CH_2CH_2CH_2OH$----------→

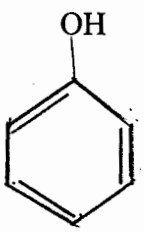
(c) $CH_3CH_2CH_2CH{=}CH_2$ + HBr---------→

(d) $CH_3CH_2CH_2CH_2OH$ + $K_2CrO_7 \cdot \underline{H_2SO_4}$_____

(e) $CH_3CH_2CH{=}CHCH_3$ + $KMnO_4$----------→

(f) CH_3COCH_3 + H_2O Acid_____

(g)



+ $\underset{H_2SO_4}{\overset{HNO_3}{\_\_\_\_\_}}$

(h) $CH{\equiv}CCH_2CH_2CH_3$ + 2HBr ----------→

(i) CH_4 + Cl_2 ----------→

(j) $CH_3CH_2CH_3$ + SO_2 ----------→

(k) $CH_3CH_2CH_3$ + $5O_2$----------→

(l) CH_3COH + [O]----------→