



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOLOGICAL AND PHYSICAL SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF EDUCATION
(SCIENCE)
1ST YEAR 2ND SEMESTER 2013/2014 ACADEMIC YEAR
REGULAR

COURSE CODE: SCH 3112

COURSE TITLE: ORGANIC CHEMISTRY

EXAM VENUE:

STREAM: (BSc. Science)

DATE: 11/8/14

EXAM SESSION: 2.00 – 4.00PM

TIME: 2 HOURS

Instructions:

- 1. Answer ALL questions in Section A and any other 2 questions in Section B .**
- 2. Candidates are advised not to write on the question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A: (30 marks)

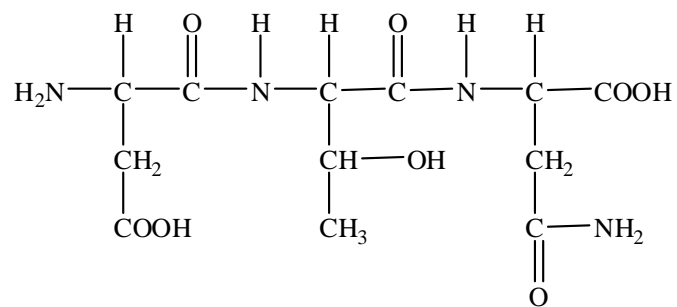
Answer all questions in this section

1. a) What is an amino acid? [1 mark]

b) Draw the structural formula for each of the following amino acids.

i) L-cysteine ii) D-alanine iii) L- valine [3 marks]

c) Identify the amino acids contained in the following tripeptide [3 marks]



d) Differentiate between the following [6 marks]

- i) Fats and oils
- ii) Sesquiterpenes and monoterpenes
- iii) Essential and non-essential amino acids

e) High fevers are extremely dangerous for the human body. Explain. [2 marks]

f) Name the two types of phospholipids and draw their general diagrams. [4 marks]

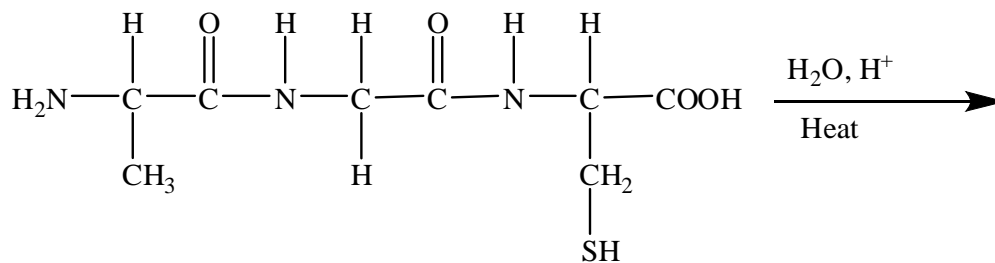
g) i) What is a lipid? [1 mark]

ii) List the five categories of lipids [5 marks]

h) Drugs that are proteins must always be injected rather than taken by mouth. Explain

[2 marks]

i) Complete the following chemical



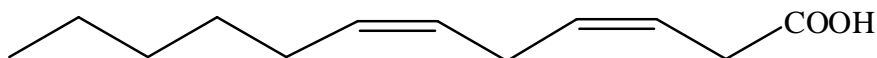
j) reaction.

[3 marks]

SECTION B: 40 Marks.

2. a) Differentiate between saturated and unsaturated fatty acids. [2 marks]

b) Below is the structural formula of a fatty acid. Use it to answer the questions that follow.



i) What is the IUPAC name of this fatty acid? [1 mark]

ii) What is the type designation (SFA, MUFA or PUFA) for this fatty acid? [1 mark]

iii) On the basis of the carbon chain length and degree of unsaturation, what is the numerical shorthand for this fatty acid? [1 mark]

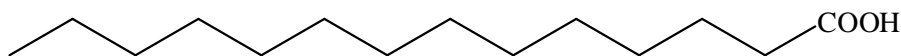
iv) To which 'omega' family of fatty acids does the fatty acid belong? [1 mark]

v) What is the 'delta' designation for the carbon chain double-bond location for this fatty acid? [1 mark]

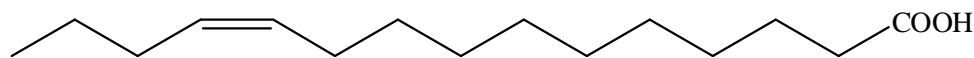
c) The solubility of fatty acids decreases with increasing carbon chain length. Explain

[3 marks]

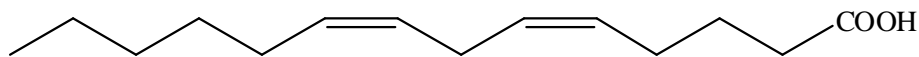
d) Below are three fatty acids.



A



B



C

i) Give the IUPAC name of each of the fatty acids above [3 marks]

ii) With reasons, arrange the fatty acids above in order of increasing melting point [3 marks]

e) Name any two essential fatty acids stating the biological importance of each [4 marks]

3. With the help of chemical equations, discuss the four main reactions of triglycerols [20 marks]

4. a) Define the following terms

i) Protein [2 marks]

ii) Prosthetic group [2 marks]

iii) Protein hydrolysis [2 marks]

b) i) Differentiate between protein denaturation and hydrolysis [2 marks]

ii) State three agents of protein denaturation [3 marks]

iii) State and explain three applications of protein denaturation [6 marks]

c) State three differences between globular and fibrous proteins [3 marks]

5. a) Define the following terms

i) Zwitterion [2 mark]

ii) Isoelectric point [2 marks]

iii) Electrophoresis [2 mark]

iv) Stereoisomers [2 marks]

b) Draw the structural forms of the following amino acids that predominates at neutral pH [6 marks]

i) Valine

ii) Aspartic acid

iii) Lysine

c) Describe how a mixture of the three amino acids in (b) above can be separated.

