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KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER
SUPLEMETARY EXAMINATIONS

FOR THE DEGREE OF BSC (CHEMISTRY)

COURSE CODE: SCH 232

COURSE TITLE: CHEMISTRY OF BIOMOLECULES

DURATION: 2 HOURS

DATE: 09/10/2018 **TIME:** 3-5PM

INSTRUCTIONS TO CANDIDATES

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of **4** printed pages. Please Turn Over

KIBU observes ZERO tolerance to examination cheating

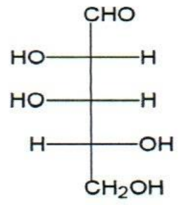
QUESTION ONE [30 MARKS]

a) You are provided with a mixture of adenine nucleotides containing adenosine, adenosine monophosphate (AMP), adenosine diphosphate (ADP) and adenosine triphosphate (ATP).

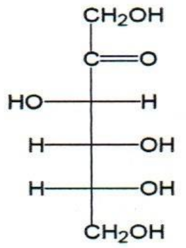
i) Using formate as counter ions explain how you would separate the mixture into its constituents using ion chromatography. **(4 marks)**

ii) Giving an explanation, show the order of elution. **(4 marks)**

b) Identify the following compounds as D or L isomers, and draw their mirror images. **(3 marks)**



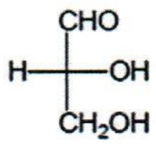
lyxose



fructose

c) Calculate the number of stereo isomers present for each of the following carbohydrate molecules. **(4 marks)**

i)



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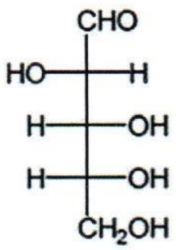

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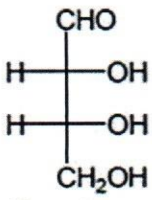
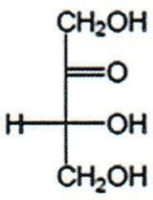


iv) 

d) Define the following terms **(5 marks)**

i) Carbohydrates
ii) Enantiomers
iii) Ketoses
iv) Oligosaccharides
v) Anomers

e) Giving an example in each case differentiate the following **(6 marks)**

i) Saturated and monounsaturated fatty acids

ii) Polar neutral amino acids and polar acidic amino acids

iii) Oligosaccharides and polysaccharides

f) Describe what happens when milk is converted into curd or yoghurt from your understanding of proteins? **(4 marks)**

QUESTION TWO [20 MARKS]

a) Briefly explain the steps followed in an enzymatic catalysis reaction where two substrates (reactants) are converted to one product. **(9 marks)**

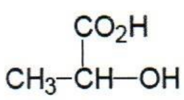
b) List the roles of carbohydrates **(8 marks)**

c) State the properties of chiral molecules **(3 marks)**

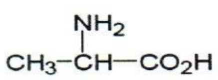
QUESTION THREE [20 MARKS]

a) Draw and name Fischer projections of D and L isomers of the following compounds: **(8 marks)**

i) Lactic acid



ii) Alanine:



b) Differentiate between Isocratic and Gradient elution? **(4 marks)**

c i) Outline the similarities between glycogen and cellulose. **(2 marks)**

ii) State their structural differences with the aid of a diagram show this concept. **(6 marks)**

QUESTION FOUR [20 MARKS]

a) Draw and name five polar amino acids **(10 marks)**

b) List any four functions of membrane proteins: **(4 marks)**

c) Explain the following types of chromatography as used in the separation of proteins. **(6 marks)**

i) Reverse phase chromatography:
ii) Hydrophobic interaction chromatography: