

TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES DEPARTMENT OF PURE & APPLIED SCIENCES UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN APPLIED CHEMISTRY 14S & 15S ACH.4212: CHEMISTRY OF CARBOHYDRATES AND PROTEINS END OF SEMESTER EXAMINATION

SERIES: APRIL2016

TIME:2HOURS

DATE: Pick Date May 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of ${\bf FIVE}$ questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

(a) Define the following terms citing an example in each case

i)	Carbohydrates		(3mks)
ii)	Epimer		(2mk)
iii)	Electrophoresis		(2mk)
iv)	Mutarotation		(2mks)
v)	Amino acid		(1mk)
(b) Give reason (s) why			
(i)	humans cannot utilize cellulose as a source of energ	у	(3mks)
(ii)	Formation of OSAZONE stops further reaction		(2mks)
(iii	Fructose gives a positive test with Tollen's reagent while ketones will give a negative test for the		
	same reagent	(3mks)	
(iv	Glycogen is most suitable as a storage form of carbohydrates in animals (2mks)		

(c) Draw the products formed when

(i) Two α -D-Glucose molecules are joined together by α -1,4-glycosidic linkage

(2mks)

(ii) α -D-Glucose and fructose are bonded together to form sucrose

(2mks)

(d) State

(i) The acid-base character of amino acids

(2mks)

(ii) FOUR applications of proteins

(2mks)

(iii) TWO basic amino acids

(1mks)

(iv) TWO acidic amino acids

(1mks)

Question TWO

(a) Draw a scheme to summarize the reactions of D-glucose with the following reagents

(i) Br_2/H_2O (2mks)

(ii) Hydroxylamine(NH₂OH) (2mks)

(iii) Nitric acid (3mks)

(iv) Phenyl hydrazine (3mks)

(v) Acetic anhydride (3mks)

(vi) H_2/Ni (3mks)

(vii) Water (2mks)

(viii) Tollen's reagent (2mks)

Question THREE

(a) State any TWO protecting agents commonly

(2mks)

(b) Outline how you would synthesize a specific dipeptide Ala-Gly in the following steps

Ala

Gly

(i) Protecting the C terminal

(4mks)

(ii) Protecting the N terminal

(4mks)

(iii) Formation of the peptide bond

(4mks)

(v) Deprotection of both C and N-terminal

(6mks)

Question FOUR

- (a) Outline the steps involved in
 - (i) Kiliani Fischer synthesis for chain lengthening of D-arabinose to D-glucose

(10mks)

(ii) Ruff degradation of D-glucose to D-arabinose

(10mks)

Question FIVE

- (a) Explain the following
 - (i) Amino acids are insoluble in diethyl ether but N-acetyl amino acids are soluble

(3mks)

(4mks)

(ii) Tryptophan is not classified as a basic amino acid even though it has a heterocycle containing nitrogen atom. Why is the N in the five membered ring of Tryptophan not readily protonated.

(3mks)

- (b) Draw the structure of Glycine and Alanine at their isoelectric point
- (c) Outline
 - (i) How you would test a solution for reducing sugar (5mks)
 - (ii) How you would test a sample for starch (3mks)
- (d) State any TWO differences between amylose and amylopectin (2mks)