NATIONAL OPEN UNVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES
APRIL/MAY, 2019 EXAMINATIONS

CHM 315 CARBOHYDRATE CHEMISTRY QUESTIONS (2 Units)

INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER THREE QUESTIONS
TIME ALLOWED, 2 HOURS.

QUESTION ONE

(a)

(i) Using α, β anomer of glucose, show the reaction equation leading to the formation of glycoside **(3 marks)**

(ii) Mention three characteristic needed for the classification of monosaccharide. **(1 ½ marks)**

(b) (i) Describe the formation of furanose and pyranose (ring-chain monosaccharide) from straight chain monomer. **(3 marks)**

(ii) Discuss the formation and distinguish between alpha and beta anomer of ring form of glucose. **(7 marks)**

(c)

(i) Complete the table below:

Disaccharide	Sources	**Component monosaccharides**
sucrose	common table sugar	glucose 1α→2 fructose
maltose		
trehalose		
lactose		
melibiose		

(2 marks)

(ii) Give the structures of the under listed disaccharides:

maltose, cellobiose, trehalos, gentiobiose, lactose and glucose. **(6 marks)**

(iii) What is Homopolysaccharides; give three examples of Homopolysaccharides. **(2 ½ marks)**

QUESTION 2

(a) Write a short note on the following: dextrins, high fructose corn syrup (HFCS), Modified starch and polydextrose. **(7 ½ marks)**

(b)

(i) Compare and differentiate between Inulin and oligofructose. **(4 ½ marks)**

(ii) Give the structre of inuling. **(3 marks)**

QUESTION 3

(a)

(i) Group these disaccharides into reducing and none-reducing sugar; cellobiose, trehalose maltose and gentiobiose. **(2 marks)**

(ii) What was your basis for the grouping? **(1 mark)**

(b) Write the equation for the reaction of glucose with five out of the following reagents: **(5 marks)**

(i) Excess pyridine $(CH_3CO)O$.

(ii) $NaBH_4$

(iii) HCN

(iv) Br_2 in water

(v) Dilute HNO_3

(vi) HI then apply heat

(c)

(i) Identify the difference(s) in the structure of a glucose and glucosamine. **(2 marks)**

(ii) Give the structure of the following; dihydroxyacetone, D-(-)-Fructose, D-(-)-Xylulose, D-(-)-Ribulose. **(4 marks)**

(iii)Why do sugar monomers rotate the plane of polarized light? **(1 mark)**

QUESTION 4

(a) What are glycosides? **(5 marks)**

(b) Write the reaction which leads to the formation of two monomeric form of methyl glucosides**.**

(5 marks)

(c)

(i) Give the equation for the mutarotion of anomeric form of glucose. **(3 marks)**

(ii) How does glycosides affect lipids. **(1 mark)**

(iii)Predict the name of the monosaccharide if the carbonyl group is: **(1 mark)**

1. Aldehyde
2. ketone

QUESTION 5

(a)

(i) differentiate between psedoheptoluse and fructose. **(1 ½ mark)**

(ii) What are enantiomers? **(½ mark)**

(b) give the structure of glucose in boat, chair and Fischer spacial presentations of glucose. **(3marks)**

(c) write short note on the role of monosaccharaides in living organisms. **(3 marks)**

(d) What are sugar alcohols? **(7 marks)**