

**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)

1. Using α, β anomer of glucose, show the reaction equation leading to the formation of glycoside **(3 marks)**
2. 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**

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

(b)

1. Compare and differentiate between Inulin and oligofructose. **(4 ½ marks)**
2. Give the structre of inuling. **(3 marks)**

**QUESTION 3**

(a)

1. Group these disaccharides into reducing and none-reducing sugar; cellobiose, trehalose maltose and gentiobiose. **(2 marks)**
2. 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 (CH3CO)O.

(ii) NaBH4

1. HCN
2. Br2 in water
3. Dilute HNO3
4. 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**

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

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

1. give the structure of glucose in boat, chair and Fischer spacial presentations of glucose.

**(3marks)**

1. write short note on the role of monosaccharaides in living organisms. **(3 marks)**
2. What are sugar alcohols? **(7 marks)**