NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SEPTEMBER/OCTOBER 2015 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: CHM 315
COURSE TITLE: Carbohydrate Chemistry

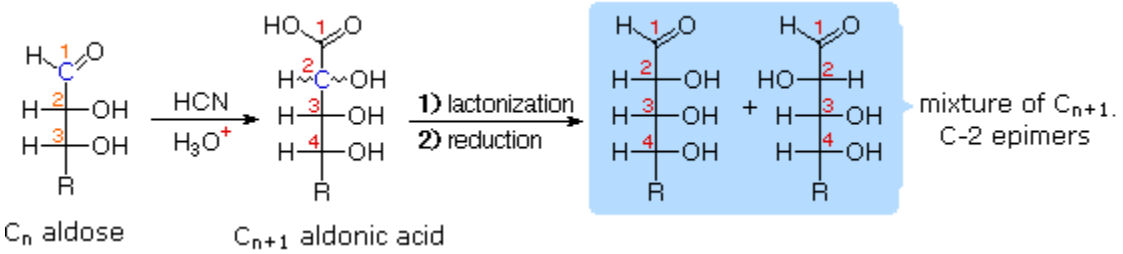
TIME: 2 hours
Instruction: Answer 4 questions only

1. a Define the term Heteropolysaccharides (1mark)
b. Write briefly on the following (*Marks will be awarded for well represented structures)*
i.Arabinoxylans. (6marks)
ii Chitin (4½ marks)
iii. Pectin (6marks)

2. a. What are Disaccharides? (1½mark)
   i. Mention the disaccharide commonly found in milk (1 mark)
   b. Write briefly on Sucrose (*marks will be given for well represented structures)* (6½marks)
   c. In tabular forms give 3 differences and 3 similarities between the following pair
   i. Cellobiose and Maltose (9marks)

3a Write briefly on osazoneformation(5½marks)
3 b. Using Chemical structures **only** show the relationship between the osazones of glucose and mannose (5marks)

3c.



What is the name given to the process represented in the above equation? (1mark)
d. With the aid of chemical structures **only** show the differences in the following
i. D-gluconic acid and D-glucuronic acid (3 marks)
ii. α-D-glucose and β- D-glucose (3marks)

4a. Differentiate between amylose and amylopectin (**Marks *will be awarded for well represented structures***) (11marks)
4b Write briefly on
i Dextran
ii Glycogen (*structures will not be necessary*) (6½marks)

5a. Define the following terms

i. Chiral Carbon (1 mark)
ii. Epimers (1 mark)
iii. Enantiomers (1 mark)
iv. Diastereomer (1 mark)
v. Mention a **C 2**epimer of glucose (½mark)

b. Enumerate and explain briefly four reactions of carbohydrates **(10marks*) (There will be no need for structures)***

c. Present the structures of the following sugars indicating the anomeric carbons
i. α-D-glucopyranose (1½ marks)
ii. β-D-galactopyranose (1½ marks)

6a.**Classify the following carbohydrates into four major named groups according to their sizes:**
Cellulose,Chitin.Fructose, Galactose,Glucose, Glycogen, Lactose, Maltose, Raffinose, Stachyose, Starch (Amylose), Sucrose, (8 marks)
6b In tabular form, describe the composition of the following disaccharides;
sucrose, maltose, trehalose, lactose and melibiose. (5 marks)
6c. Give the structures of the following carbohydrates:
i. D-Fructose (straight chain) (1½marks)
ii D-Ribose (Straight Chain)(1½marks)
iii.Cellobiose(1½marks)