



الإجابة النموذجية لامتحان الكربوهيدرات والمنتجات الطبيعية

٣١٦ ك

(نصف ورقة امتحانية)

الفرقة : الرابعة

الشعبة : كيمياء خاص وكيمياء اشعاعية

التاريخ : الثلاثاء ٣ / ١ / ٢٠١٧

الممتحن : د/ عبد المتعال عبدالمجيد الشيخ

قسم : الكيمياء

كلية : العلوم

****Answer the following questions:**

[Q3] A. Choose the correct answer:

(6 Marks)

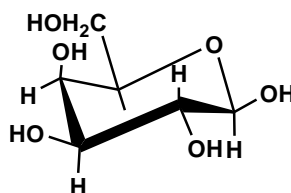
i. Epimers are stereoisomers that

c) Differ in the configuration around a single C atom in a sugar molecule

ii. For a compound containing four chiral atoms, the number of stereoisomers is

b) 16

iii. The following structure represents



c) The β -D-form of an aldohexose

iv. The compound which is optically active must be :

a) Asymmetric

v. The Symbol “D” means that:

b) The OH at the last stereo-center is to right

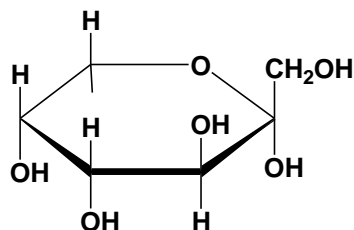
d) The compound is dextrorotatory

vi. α -D-Glucose and β -D-Glucose are

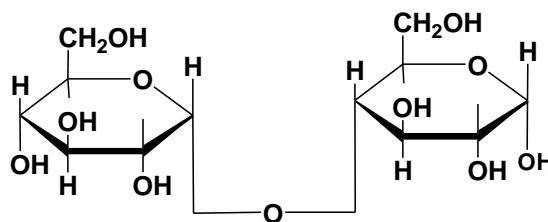
b) Anomers

(B). Draw the Cyclic structure of each of the following (Select only Three) (3 Marks)

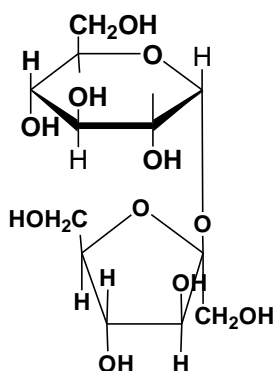
i. α -D-Fructopyranose



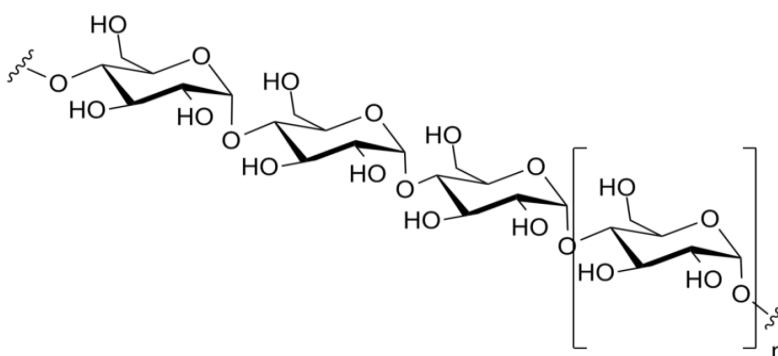
ii. Maltose



iii. Sucrose

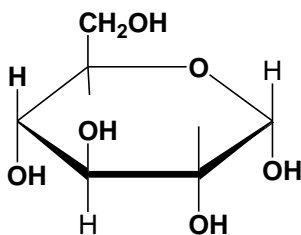
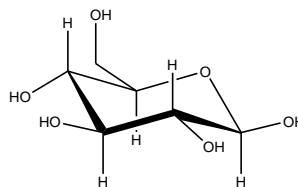
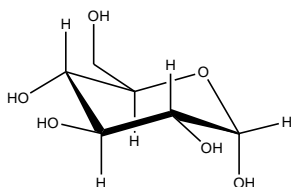


iv. Cellulose

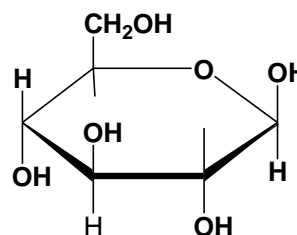


(C). Draw both anomers of D-Glucose in their pyranose form

(3 Marks)



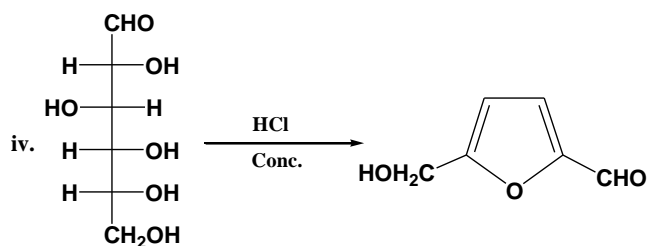
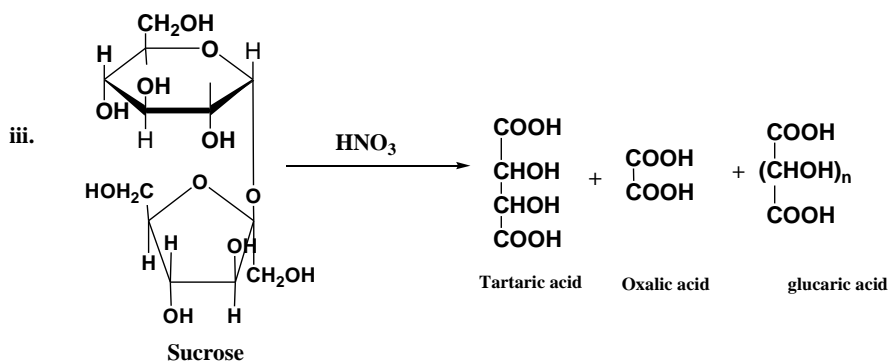
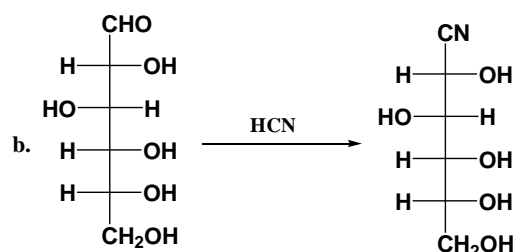
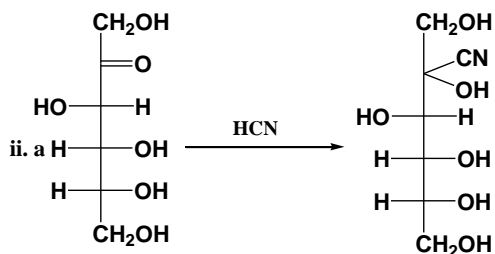
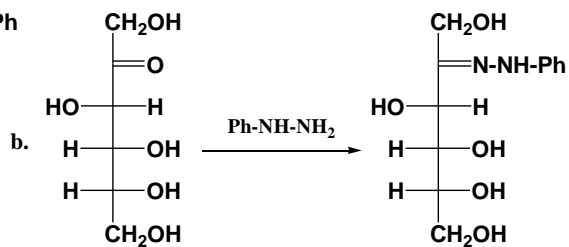
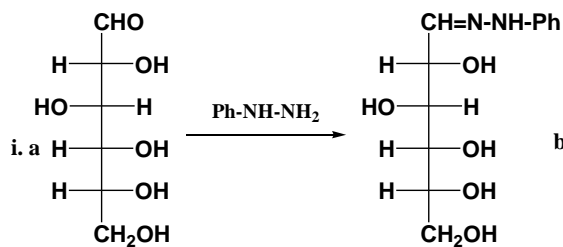
α -pyranose form



β -pyranose form

[Q4] (A). What is the Action of :

(6 Marks)



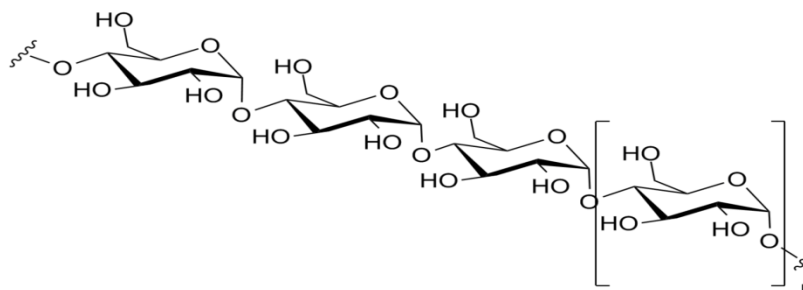
(B). Define each of the following terms, and give an example

(6 Marks)

i. Polysaccharides

Polysaccharides are polymeric carbohydrate molecules composed of long chains of monosaccharide units bound together by glycosidic linkages and on hydrolysis give the constituent monosaccharides or oligosaccharides. They range in structure from linear to highly branched.

Ex: Starh and Cellulose



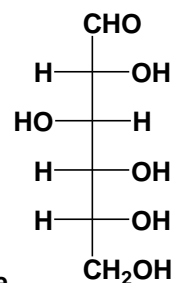
Cellulose

ii. Epimers

Epimers are diastereomers that contain more than one chiral center but differ from each other in the absolute configuration at only one chiral center (one stereogenic center) . eg: 1 and 2 have the same molecular formula and the same structural formula and, therefore, stereoisomers. Doxorubicin and epirubicin are two epimers that are used as drugs.

iii. Dextrorotatory D (+)

A dextrorotatory compound is a compound that rotates the plane of polarized light clockwise as it approaches the observer (to the right if you are steering a car).



Ex.

D-Glucose

iv. Dextrins

are a group of low-molecular-weight carbohydrates produced by the hydrolysis of starch or glycogen.

Or are mixtures of polymers of D-glucose units linked by α -(1 \rightarrow 4) or α -(1 \rightarrow 6) glycosidic bonds.

Ex. Amylodextrins, erythrodextrins, and achrodextrins.

v. Reducing sugar : Sugars that contain aldehyde groups that are oxidized to carboxylic acid by tollen's or benedict reagent, and this may be mono- or disaacharide

Ex.: Glucose, Galactose and Maltose

vi. Enantiomers

Organic compounds that contain a chiral carbon usually have two non-super-imposable structures. These two structures are mirror images of each other and are, thus, commonly called enantiomorphs (enantio = opposite ; morph = form), and this structural property is commonly called enantiomerism .

Ex. Aldohexoses : Contain 4 chiral carbon atoms so, there are sixteen optically active forms (8 pairs of enantiomers)