Biomolecules

Question1

A carbohydrate (A), when treated with dilute HCl in alcoholic solution gives two isomers (B) and (C). B on reaction with bromine water gives a monocarboxylic acid ' Z ' and ' C ' is a ketohexose. What is A ?

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Options:

A.

Starch

B.

Maltose

C.

Sucrose

D.

Lactose

Answer: C

Solution:

The reaction involved is as follows,

$$\underset{\text{Sucrose (A)}}{C_{12}H_{22}O_{11}} + \underset{\text{Alcoholic solution}}{\text{dil HCl in}} \longrightarrow \underset{\text{Glucose (B)}}{C_6H_{12}O_6} + \underset{\text{Fructose (C)}}{C_6H_{12}O_6}$$

$$\underset{\text{(B)}}{C_6H_{12}O_6} + \underset{\text{Water}}{Br_2} \longrightarrow \underset{\text{Gluconic acid (Z)}}{C_6H_{12}O_7} + 2HBr$$

Question2

Which of the following hormones is an example of polypeptide?

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Options:

A.

Epinephrine

B.

Insulin

C.

Estrogen

D.

Androgen

Answer: B

Solution:

The correct answer is:

✅ **Option B: Insulin**

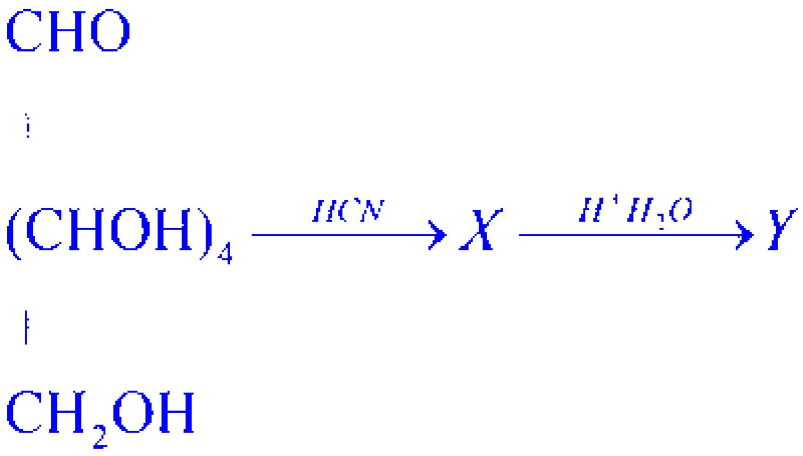
Explanation:

- **Polypeptide hormones** are made up of chains of amino acids.
- **Insulin** is a classic example — it's composed of two peptide chains (A and B chains) linked by disulfide bonds.
- **Epinephrine** is a **catecholamine** (derived from the amino acid tyrosine).
- **Estrogen** and **androgen** are **steroid hormones** derived from cholesterol.

Hence, **Insulin** is the **polypeptide hormone** among the options.

Question3

What is the IUPAC name of the product Y in the given reaction sequence?



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Options:

A. 2,3,4,5,6,7 - hexahydroxyheptanoic acid

B. 2,3,4,5,6 - pentahydroxyhexanoic acid

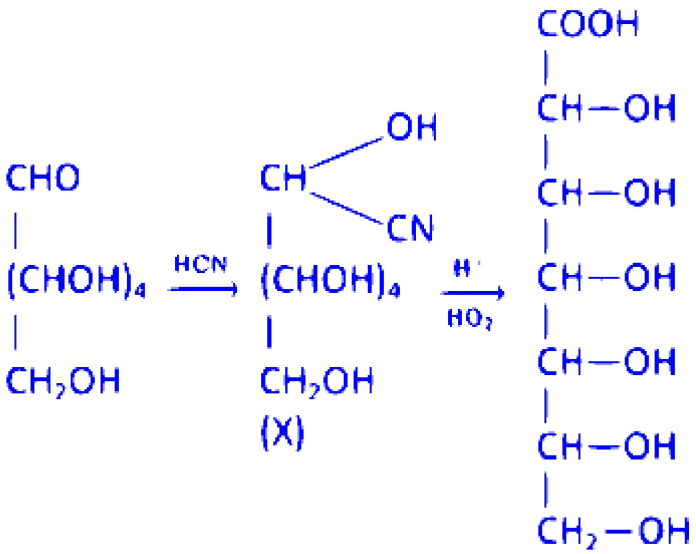
C. 3,4,5-trihydroxyheptanoic acid

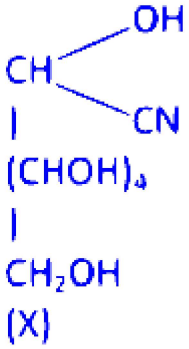
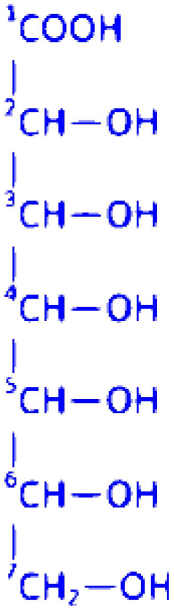
D. 3,4,5 - trihydroxyhexanoic acid

Answer: A

Solution:

The reaction will takes place as follows



Then X is  ; Y is 

[2,3,4,5,6,7-hexahydroxyheptanoic acid]

Question4

Two statements are given below :

I. Milk sugar is disaccharide of α-D-galactose and β-D-glucose

II. Sucrose is disaccharide of α-D-glucose and β-D-fructose

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Options:

A. Both statements I and II are correct.

B. Both statement I and II are incorrect.

C. Statement I is correct but statement II is incorrect.

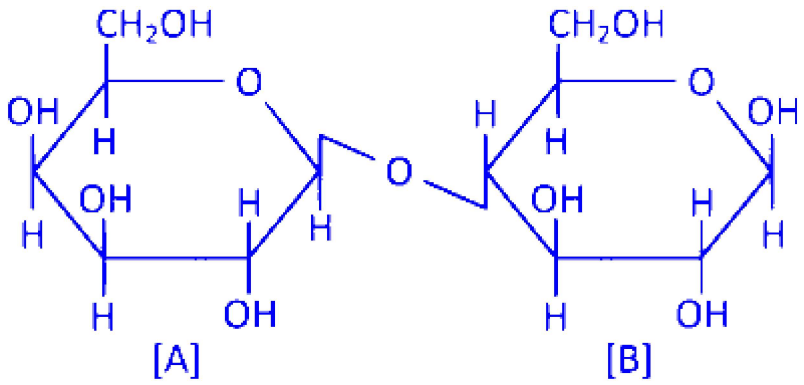
D. Statement I is incorrect but statement II is correct.

Answer: D

Solution:

Statement I is incorrect but statement II is correct. The correct form of statement I is,

Lactose commonly known as milk sugar is made up of β-D-galactose (A) and β-D-glucose (B).



Question5

Which of the following vitamin is also called pyridoxine?

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Options:

A. B_6

B. B_{12}

C. B_2

D. B_1

Answer: A

Solution:

Vitamin B_6 is also called as pyridoxine.

Vitamin B_{12} is also called as cyanocobalamin.

Vitamin B_2 is also called as Riboflavin.

Vitamin B_1 is also called as Thiamine.

Question6

Cellulose is a polysaccharide and is made of

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Options:

A. β-D-glucose units joined through 1,4-glycosidic linkages

B. α-D-glucose units joined through 1,4-glycosidic linkages

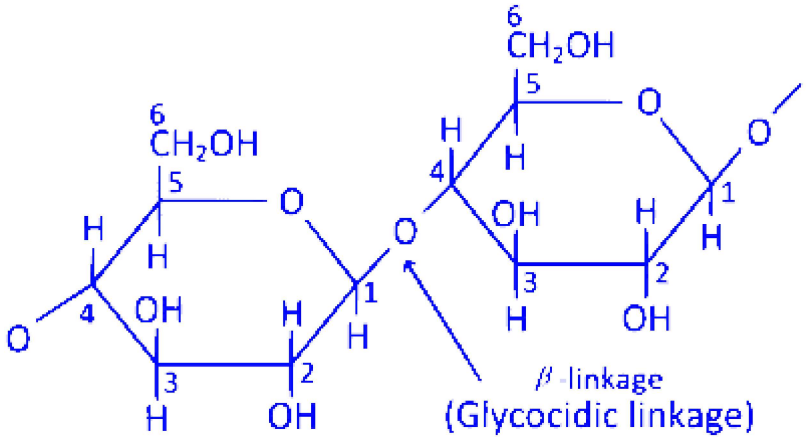
C. $\alpha - D$-glucose units joined through 1,6-glycosidic linkages

D. β-D-glucose units joined through 1,6-glycosidic linkages

Answer: A

Solution:

Cellulose is a polysaccharide and it is made of β-D glucose units joined through 1, 4-glycosidic linkage.



Question7

The functional groups involved in the conversion of glucose to gluconic acid and gluconic acid to saccharic acid respectively are

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Options:

A. $-CHO, \rangle CHOH$

B. $-CHO, -CH_2OH$

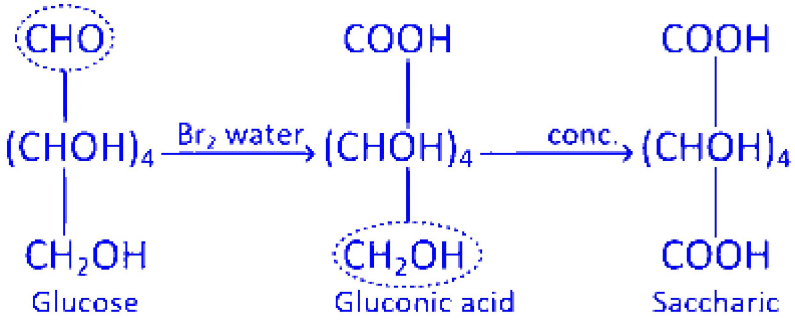
C. $-CH_2OH_4 - CHO$

D. $-CH_2OH, \rangle CHOH$

Answer: B

Solution:

Glucose is converted to gluconic acid by oxidation with Br_2 water and to saccharic acid when oxidation is carried by conc. HNO_3. The reaction is as follows



Functional groups involved are -CHO and $-CH_2OH$.

Question8

The functional group present in asparagine, a non-essential amino acid, are

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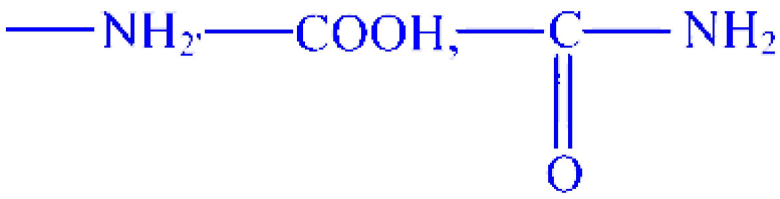
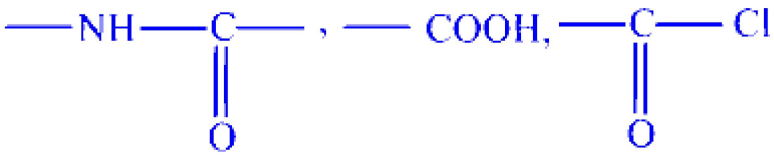
Options:

A.

B.



C.

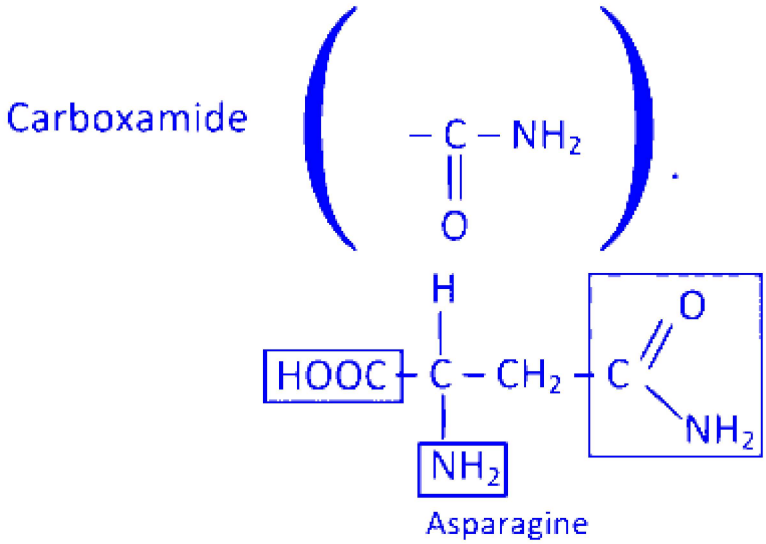


D.

Answer: B

Solution:

The asparagine amino acid consists of an alpha-amino group ($-NH_2$), an alpha carboxylic group ($-COOH$) and a side chain of



Question9

Which of the following is the incorrect statement about maltose?

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Options:

A. It is a reducing sugar

B. It is composed of two α-D-glucose units

C. It is composed of one β-D-glucose and one β-D-galactose unit

D. It has 1, 4-glycosidic linkage

Answer: C

Solution:

The incorrect statement about maltose is given in option (c) because it is composed of 2 molecules of α-D-glucose.
