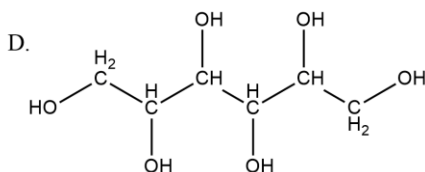
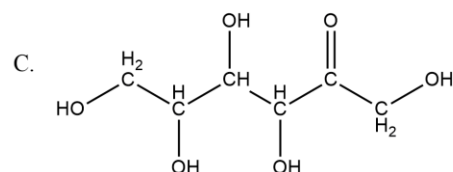
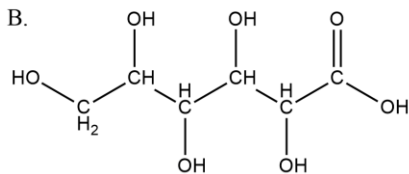
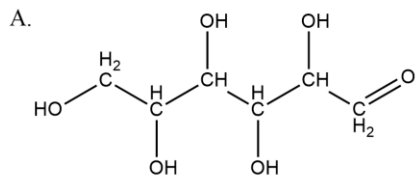


## CARBOHYDRATES

1. Name the following structures by using IUPAC system.



2. What are the functional groups in carbohydrates.

3. Explain briefly how carbohydrates are produced with reaction in the nature.

4. Write equations for the following reactions with structural formulae of the substances.

A. oxidation of glucose.

B. reduction of fructose

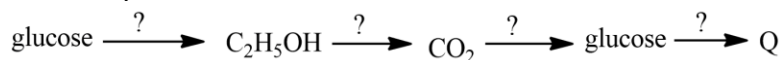
C. fermentation of glucose

D. oxidation of glucose by Tollen's reagent

5. Propose a common reagent to identify glucose as an aldehyde and as a polyhydric alcohol.

Write schematically the equations of these reactions and specify the conditions under which they are carried out.

6. Perform the following transformations by using molecular formulae of the substances. Indicate the necessary conditions in nature and name each transformation.



7. Calculate mass of ethyl alcohol obtained by the fermentation of 1 kg of glucose.

8. One gram of glucose provides 17.6 kJ of energy to our body. Calculate the energy provided by 200 g of grape juice containing 20% glucose.

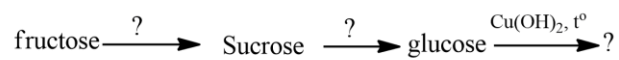
9. When a mixture of glucose and fructose is reduced, 182 g of sorbitol was formed. The same amount of mixture, when heated with  $\text{Cu}(\text{OH})_2$ , it gives 86.4 g of  $\text{Cu}_2\text{O}$ . Calculate the mass each, glucose and fructose in the initial mixture.

10. Calculate the mass of gluconic acid that can be formed when 2 moles of glucose is oxidized.

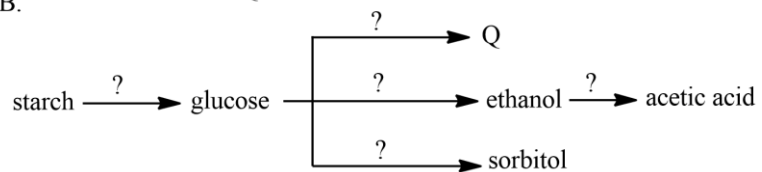
11. Determine the mass of calcium hydroxide must be consumed in the absorption of carbon dioxide, obtained from the fermentation of 10 kg of glucose containing 5% impurities.

12. Perform the following transformations.

A.



B.



13. Which of the following carbohydrates contains the most carbon content by mass.

- A. glucose                  B. fructose                  C. sucrose

14. What is the mass of sucrose produced from 5 tons of sugar beet with 15% of sucrose by mass?

15. What is the mass of glucose obtained from the hydrolysis of the starch in 250 kg of potatoes, which contains 24% starch by mass?