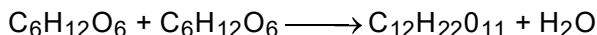


1. What is sucrose?

Sucrose is a disaccharide. It is made up of two mono saccharides glucose and fructose.

2. Write the balanced chemical equation for the reaction when glucose combines with fructose to give sucrose.**3. Name the two main sources of sucrose.**

The two main sources of sucrose are cane sugar and beet root sugar.

4. How are carbohydrates classified?

Carbohydrates are classified based on the number of sugar units into monosaccharides, disaccharides and polysaccharides.

5. Why is the use of jaggery recommended than white crystalline sugar?

Jaggery is recommended than white crystalline sugar because of the presence of useful nutrients in addition to carbohydrates.

6. What is caramel?

The sticky substance formed when sugar is heated to about 473K is called caramel.

7. Why is caramel used in making chocolates and candies?

Caramel imparts a characteristic colour and flavour to chocolates and candies.

8. How does high concentration of sugar act as a preservative of food?

High concentration of sugar prevents the growth of micro-organisms. Hence it can be used as a preservative.

9. Give reason:**a) Fruit juices mixed with sugar should be consumed quickly.**

If fruit juices mixed with sugar are stored for hours or days, they turn sour and give a different taste.

b) Thick sugar syrup can store fruit juices for many days.

Sugar tends to draw water from the microbes. This process leaves the microbial cells dehydrated, thus killing them. In this way, the food will remain safe from microbial spoilage

c) The shelf life of sucrose is more than that of jaggery.

Jaggery absorbs the moisture and starts to ferment in rainy season. In sucrose the water content is removed. Hence it can be stored for a longer time.

10. What is the need for the use/manufacture of sugar?

When compared to jaggery, sugar has a greater shelf life and it can be stored easily in any climatic condition.

11. What is meant by fermentation?

The aqueous solution of sugar undergoes chemical reaction called fermentation.

12. In which form do carbohydrates get assimilated in our body?

Carbohydrates in the form of starch, disaccharides and mono saccharides get assimilated by our body.

13. What is starch?

Starch is a natural polymer formed by many units of mono saccharides.

14. What happens when a few drops of concentrated sulphuric acid is added to a test tube containing starch?

Hydrogen and oxygen present in carbohydrates are absorbed by sulphuric acid in the form of water. Black carbon residue is left behind.

15. What happens when quick lime is added to a test tube containing glucose and gently heated?

Quick lime is a drying agent. It does not get charred.

16. Give reason: Sulphuric acid added to a test tube containing glucose gets charred but not when quick lime is added.

Sulphuric acid is a dehydrating agent so it absorbs hydrogen and oxygen present in glucose. But quick lime is only a drying agent so it does not get charred.

17. What is the difference between drying agent and dehydrating agent?

Drying agent	Dehydrating agent
Drying agent simply removes excess water present in a substance which is not chemically bound to it. Ex: Quick lime	Dehydrating agents remove water which is chemically bound to a substance. Ex: Sulphuric acid

18. Mention the steps involved in the manufacture of sucrose or common sugar.

- Extraction of juice from sugarcane or beet root.
- Purification of juice.
- Concentration and crystallization.
- Separation and drying of crystals.

19. Briefly explain the manufacture of sucrose or common sugar.

- Sugarcane or sugar beet is cut into pieces, crushed in a series of roller mills.
- The juice is warmed and run into settling tanks.
- It is decanted from the sediment and made alkaline with calcium hydroxide.
- The impurities get precipitated.
- The liquid is steamed to coagulate protein matter and allowed to settle.
- The clear juice is concentrated into syrup by evaporation under reduced pressure. The syrup is cooled to crystallize into sugar.
- The crystals are dissolved in hot water and decolourised with animal charcoal or with coconut shell charcoal. It is then filtered.
- Hydrosol or sodium bi sulphate is added which generates sulphur dioxide which removes colour impurities.
- The filtrate is concentrated and evaporated under reduced pressure to get syrup.

j) The syrup is crystallized to get white crystals of sugar.

20. What is bagasse?

Bagasse is the cellulose material of the sugarcane residue.

21. What is celotex?

Celotex is a type of cardboard prepared by using bagasse as raw material.

22. What is norit?

The coconut shell charcoal used to decolourise sugar is called norit.

23. What is hydrosol? What is its use?

Hydrosol is chemically sodium bi sulphate. It is added to lighten the colour of jaggery or sugar during its manufacture.

24. What is molasses?

The uncrystallised syrup left behind in the form of brown viscous liquid is molasses.

25. What is the role of animal charcoal or coconut shell charcoal in the manufacture of sugar?

Animal charcoal or coconut shell charcoal is used as a decolouring agent in the manufacture of sugar. It makes sugar white.

26. Give reason: Evaporation of sugarcane juice is done under reduced pressure.

When sugarcane juice is evaporated under reduced pressure, boiling takes place at a lower temperature and sugar can be obtained at a lower temperature.

27. Mention a test for sugar/sucrose. OR How do you test the presence of sugar in a banana? OR How do you test a blood/urine sample of a diabetic person for sugar?

Take an aqueous solution of the sample to be tested and mix it with hydrochloric acid. Add Fehling's solution (Alkaline copper sulphate solution). If reddish precipitate is obtained, it indicates the presence of sugar/sucrose in the given sample.

28. Define fermentation.

Fermentation is a chemical decomposition produced by micro-organisms on certain organic matter.

29. On what factors does fermentation depend?

Fermentation depends on:

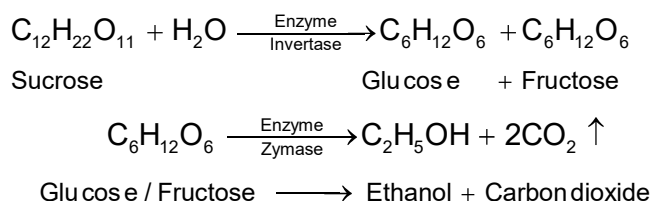
- Suitable temperature range.
- Dilution of matter.

30. Mention the steps involved in the fermentation of molasses.

- Dilution of molasses by water such that the solution contains about 10% sugar.
- Addition of yeast and maintaining the temperature range of 308K to 313K.
- Distillation of the fermented matter.

31. Briefly explain how Ethyl alcohol or ethanol is prepared.

- Molasses is diluted with water and acidified by adding dilute sulphuric acid.
- Yeast is added to the solution and the container is closed.
- The temperature is maintained around 308K.
- Fermentation takes place in about a week. It contains 6% – 10% alcohol.
- It is fractionally distilled to obtain 95% alcohol.

**32. What is wort?**

During the manufacture of ethyl alcohol or ethanol, the fermented matter is called wort.

33. State the function of the following:

- Steaming in the process of manufacture of sucrose: It is used to coagulate proteins and make them settle.
- Enzyme invertase in the manufacture of ethanol: It converts sucrose into glucose and fructose.
- Enzyme zymase in the manufacture of ethanol: It converts glucose/fructose into ethanol.

34. Give reasons: Milk turns into curds very quickly and becomes sour in summer.

Milk turns into curds when the temperature is around 30-40 °C which promotes the growth of bacteria (Lactobacillus). Hence milk turns into curds very quickly in summer.

35. A small quantity of curds is added to milk. The mixture is kept in the refrigerator for about 4 hours. When it is taken out, it is observed that it has not curdled completely. Give scientific reason.

When the mixture of milk and curds is kept in the refrigerator, the temperature is about 6 to 8 °C. For the conversion of milk to curds a temperature of 30-40 °C is necessary. Hence it is curdled completely.

36. How is ethanol being used as a fuel?

Ethanol / Ethyl alcohol is being blended with diesel and used as fuel by KSRTC of Karnataka.

37. How is ethanol or ethyl alcohol used in ayurveda?

In many ayurvedic tonics, alcohol is present in small extent. It stimulates and improves appetite.

38. Give reason: The use of ethanol as fuel conserves fossil fuels.

Ethanol is a good fuel. It can be mixed with diesel and used as fuel. Hence it reduced the dependency on fossil fuels.

Fill in the blanks:

1. Sucrose is a **disaccharide**.
2. The two main sources of sucrose are **cane sugar and beet root sugar**.
3. The vegetable that contains more sucrose is **beetroot**.
4. The molecular formula of sucrose is **C₁₂H₂₂O₁₁**.
5. Sucrose consists of **two** mono saccharides.
6. The sticky substance formed when sugar is heated to about 473K is called **caramel**.
7. The protein matter in the sugarcane juice is coagulated by **steaming**.
8. The substance used to make hard boiled sugar candy is **caramel**.
9. The duration for which a food item can be preserved is called **shelf life**.
10. Hydrogen and oxygen in carbohydrates are present in the ratio **2:1**.
11. Humans cannot digest carbohydrates in the form of **cellulose**.
12. Carbohydrates get assimilated in our body in the form of glucose.
13. Humans can digest carbohydrates in the form of **starch, disaccharides and mono saccharides**.
14. The fibrous matter present in vegetables is **cellulose**.
15. An example of a natural polymer formed by many units of monosaccharides is **starch**.
16. Sucrose is made of one unit of glucose and one unit of fructose.
17. An example of a good dehydrating agent is **concentrated sulphuric acid**.
18. An example of a drying agent is **Quick lime**.
19. The cellulose material of the sugar cane residue is called **bagasse**.
20. The residue of sugarcane from which the juice is extracted can be used to prepare **cardboard**.
21. **Bagasse** is used as a raw material to prepare **cardboard**.
22. Bagasse is used as a raw material to prepare **cardboard** known as **celotex**.
23. A type of cardboard prepared by using bagasse as raw material is **celotex**.
24. The coconut shell charcoal used to decolourise sugar is called **norit**.
25. Hydrosol is chemically **sodium bi sulphate**.
26. The substance added to lighten the colour of jaggery or sugar during its manufacture is **hydrosol or sodium bi sulphate**.
27. The uncrystallised syrup left behind in the form of brown viscous liquid is called **molasses**.
28. The molecular formula of ethanol/ethyl alcohol is **C₂H₅OH**
29. Molasses is used to prepare **ethyl alcohol**.
30. The raw material used to manufacture ethyl alcohol is **molasses**.
31. The chemical added to test the presence of sugar are **hydrochloric acid and Fehling's solution**.
32. The colour observed when hydrochloric acid and Fehling's solution is added to test sugar is **reddish**.
33. The word fermentation is derived from Greek language which means **boiling**.
34. The chemical decomposition produced by micro-organisms on certain organic matter is called **fermentation**.

35. The by-product of fermentation is carbon dioxide.
36. The matter which undergoes fermentation is called substrate.
37. The temperature range necessary for fermentation of molasses is 308 K to 313K.
38. During the manufacture of molasses, it is acidified using dilute sulphuric acid.
39. The fermented matter during the manufacture of molasses is called wort.
40. The enzyme which converts sucrose to glucose and fructose is invertase.
41. Invertase converts sucrose to glucose.
42. The enzyme which converts glucose to ethanol is zymase.
43. Zymase converts glucose/fructose into ethanol.
44. The substance which is used in Ayurveda to stimulate and improve appetite is alcohol.
