What is the chemical formula for Glucose Chemistry Questions with Solutions

Q1. What is the chemical formula of glucose?
(a) $C_5H_{10}O_5$
(b) $C_6H_{12}O_6$
(c) $C_7H_{14}O_7$
(d) None of the above
Answer: (b) $C_6H_{12}O_6$

Q2. What is another name for glucose?
(a) Aldohexose
(b) Dextrose
(c) Both (a) and (b)
(d) None of the above
Answer: (c) Both (a) and (b)

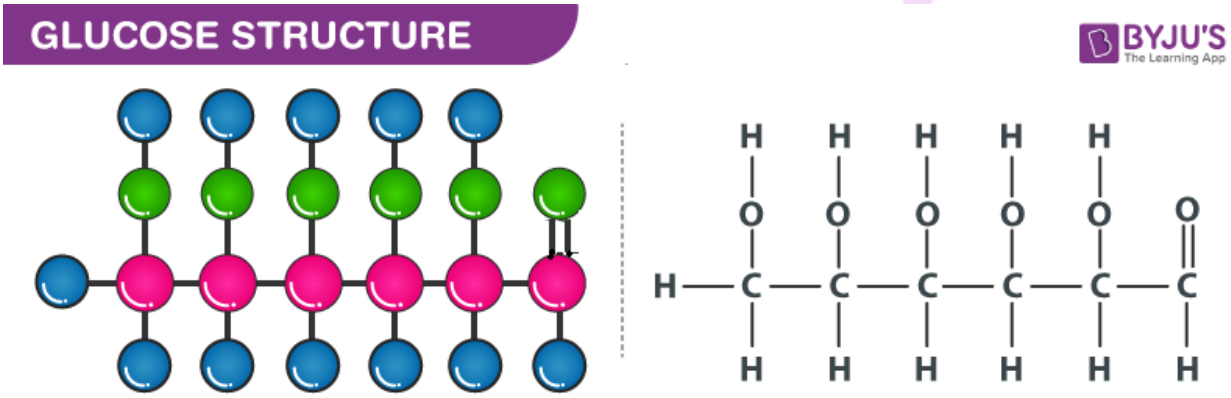
Q3. Glucose is soluble in _____ and _____.
(a) Water and acetic acid
(b) Benzene and acetic acid
(c) n-Hexane and acetic acid
(d) All of the above
Answer: (a) Water and acetic acid

Q4. Which of the following functional group is present in glucose?
(a) Aldehyde
(b) Ketone
(c) Both (a) and (b)
(d) None of the above
Answer: (c) Both (a) and (b)

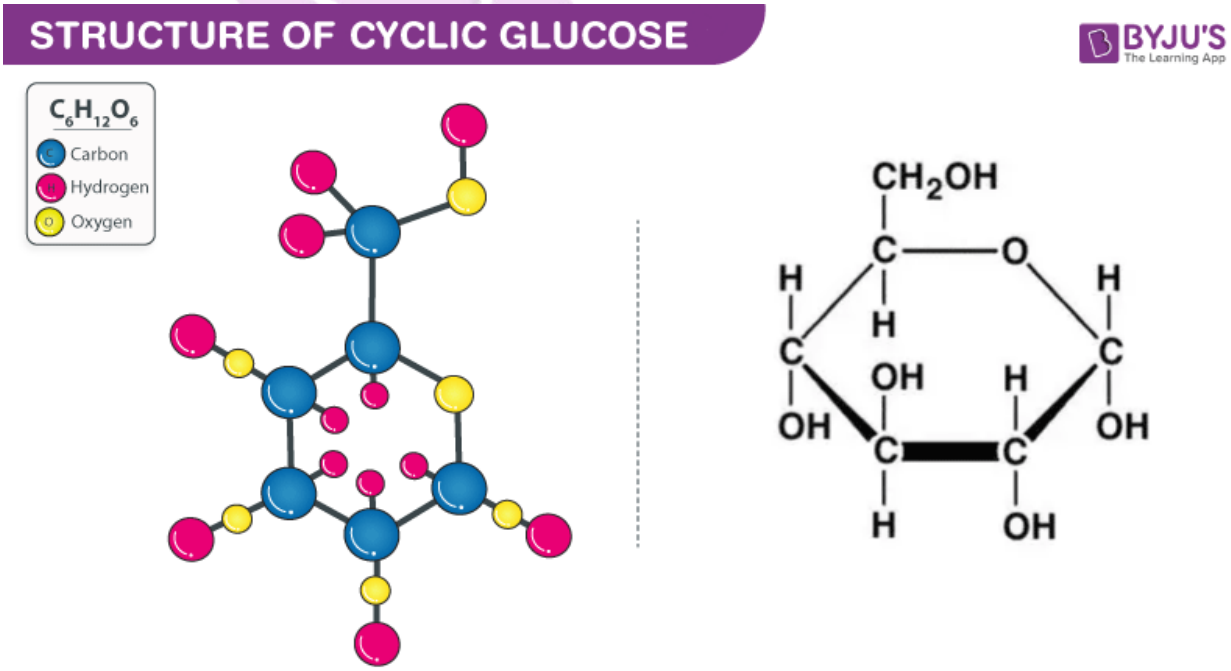
Q5. How many aldehydic groups are there in glucose?
(a) One
(b) Five
(c) Both (a) and (b)
(d) None of the above
Answer: (a) One

Q6. How many alcoholic groups are there in glucose?
(a) One
(b) Five
(c) Both (a) and (b)
(d) None of the above
Answer: (b) Five

Q7. Draw the structure of glucose.
Answer: Structure of Glucose:



Q8. Draw the cyclic structure of glucose.
Answer: Cyclic structure of Glucose:



Q9. How is glucose prepared from carbohydrates?
Answer: Glucose can be synthesised by hydrolysis of carbohydrates like sucrose, lactose, cellulose, maltose, or glycogen.
$C_{12}H_{22}O_{11}$ (Sucrose) + $H_2O \rightarrow C_6H_{12}O_6$ (Glucose) + $C_6H_{12}O_6$ (Fructose)

Q10. How is glucose prepared from starch?
Answer: We can prepare glucose by boiling starch with dilute sulphuric acid at 393 K and 2 to 3 atmosphere pressure.
$(C_6H_{12}O_5)_n$ (Starch) + n $H_2O \rightarrow$ n $C_6H_{12}O_6$ (Glucose)

Q11. How can you justify the presence of six carbon atoms in straight-chain glucose?
Answer: We can react straight-chain glucose with hydrogen iodide and red phosphorous to justify the presence of six carbon atoms in straight-chain glucose.

Q12. What is reducing sugar?
Answer: A carbohydrate containing that has free aldehyde or ketone group and gives positive tollens, or fehlling reagent test is referred to as reducing sugar.

Q13. What is the general formula for carbohydrates?
Answer: The general formula for carbohydrates is $C_n(H_2O)_n$.

Q14. How can you justify the absence of the aldehyde group in the pentaacetate of D-glucose?
Answer: Glucose reacts with hydroxylamine to form an oxine, whereas the penta acetate of glucose does not react with hydroxyl amine, indicating the absence of a free aldehyde group.

Q15. What are the applications of glucose?
Answer: Glucose is a monosaccharide with six carbon atoms, five hydroxyl groups and one aldehyde group. There are a plethora of applications of glucose.
1. It is used to treat hypoglycemia.
2. It is used as a forerunner for the synthesis.
3. It is used to treat hyperkalemia.

Practice Questions on What is the chemical formula for Glucose

Q1. Glucose and fructose differ in _____.
(a) Optical rotation
(b) Taste
(c) Both (a) and (b)
(d) None of the above

Answer: (a) Glucose and fructose differ in optical rotation.

Q2. What are biomolecules?
Answer: Biomolecules are the building blocks of life and perform important functions in living organisms.
Carbohydrates, Proteins, Lipids, and Nucleic Acids are the best examples of biomolecules in living organisms.

Q3. How can you justify the presence of an aldehyde group in the glucose molecules?
Answer: We can justify the presence of an aldehyde group in the glucose molecules by
Glucose react with hydroxylamine to form a monoxime. It adds one molecule of hydrogen cyanide to give cyanohydrin, so it contains a carbonyl group which can be an aldehyde or a ketone.
On mild oxidation with bromine water, glucose gives gluconic acid, a six-carbon acid. It indicates that the carbonyl group present in glucose is an aldehydic group.

Q4. How can you justify the presence of five hydroxyl groups in the glucose molecules?
Answer: We can justify the presence of five hydroxyl groups in the glucose molecules by reacting glucose with acetic anhydride. It gives glucose pentaacetate, confirming the presence of five hydroxyl groups. Since it is a stable compound, five hydroxyl groups should be attached to different carbon atoms.

Q5. What does the body do when there is no glucose?
Answer: When you go a few hours without eating, blood sugar levels go down. If you have a healthy pancreas, it releases a hormone called glucagon to make up for the absence of food. This hormone tells your liver to process the stored sugars and release them into your bloodstream.