

# Carbon and Its Compounds

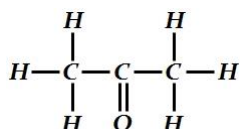
## Theory Questions

### 1 Mark:

1. What happens when a small piece of sodium is dropped into ethanol? [CBSE 2009]
2. State two characteristic features of carbon which when put together give rise to a large number of carbon compounds.' [CBSE 2010]
3. Write the number of covalent bonds in the molecule of ethane.' [CBSE 2015]
4. Write the name and structure of an alcohol with three carbon atoms in its molecule.' [CBSE 2016]
5. Write the molecular formula of the 2nd and the 3rd member of the homologous series whose first member is methane.' [CBSE 2017]

### 3 Marks:

6. A. Why are covalent compounds generally poor conductors of electricity? [CBSE 2008]  
B. Name the following compound :



- C. Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?' [CBSE 2008]
7. Distinguish between esterification and saponification reactions of organic compounds.' [CBSE 2009]  
With a labelled diagram described an activity to show the formation of an ester.
8. Name the functional group of organic compounds that can be hydrogenated. With the help of suitable example explain the process of hydrogenation mentioning the conditions of the reaction and any one change in physical property the formation of the product. Name any one natural source of organic compounds that are hydrogenated.' [CBSE 2010]
9. List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed.' [CBSE 2015]
10. Draw the electron-dot structure for ethyne. A mixture of ethyne and oxygen is burnt for welding. In your opinion why cannot we use a mixture of ethyne and air for this purpose?' [CBSE 2015]
11. Write chemical equation of the reaction of ethanoic acid with the following : [CBSE 2016]  
A. sodium; B. Sodium hydroxide; C. Ethanol.  
Write the name of one main product of each reaction.
12. An aldehyde as well as a ketone can be represented by the same molecular formula, say  $\text{C}_3\text{H}_6\text{O}$ .  
Write their structures and name them. State the relation between the two language of science. ' [CBSE 2016]
13. Write the structural formula of ethanol. What happens when it is heated with excess of conc.  $\text{H}_2\text{SO}_4$  at 443 K?  
Write the chemical equation for the reaction stating the role of conc.  $\text{H}_2\text{SO}_4$  in this reaction.' [CBSE 2017]
14. Distinguish between esterification and saponification reaction with the help of the chemical equations for each.  
State one use of each. [CBSE 2017]  
Esters, and  
Saponification process.

### 5 Marks:

15. Distinguish between ionic and covalent compounds under the following properties: [CBSE 2008]  
A. Strength of forces between constituent elements.

- B. Solubility of compounds in water  
C. Electrical conduction in substances'
16. Both soap and detergent are some type of salts. What is the difference between them? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water? List two problems that arise due to the use of detergents instead of soaps. [CBSE 2015]
17. A carbon compound 'P' on heating with excess conc.  $H_2SO_4$  forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R'. One molecule of 'R' on combustion forms two molecules of carbons dioxide and three molecules of water. Identify P, Q, and R and write chemical equations for the reactions involved.' [CBSE 2016]
18. Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and alkynes and also draw the structure of the member of each series . Write the name of the reaction the converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur.' [CBSE 2017]

#### PRACTICAL BASED QUESTIONS:

19. What do we observe on pouring acetic acid on red and blue litmus papers ?  
A. Red litmus remains red and blue litmus turns red.  
B. Red litmus turns blue and blue litmus remains blue.  
C. Red litmus turns blue and blue litmus turns red.  
D. Red litmus becomes colourless and blue litmus remains blue. [CBSE 2015]
20. A student takes about 4 mL of distilled water in four test tubes marked P, Q, R and S. He then dissolves in each test tube an equal amount of one salt in one test tube, namely sodium sulphate in P, potassium sulphate in Q, calcium sulphate in R and magnesium sulphate in S. After that he adds an equal amount of soap solution in each test tube. On shaking each of these test tubes well, he observes a good amount of lather (foam) in the test tubes marked  
A. P and Q  
B. Q and R  
C. P, Q and S  
D. P, R and S [CBSE 2015]
21. While preparing soap a small quantity of common salt is generally added to the reaction mixture of vegetable oil and sodium hydroxide. Which one of the following may be the purpose of adding common salt ?  
A. To reduce the basic nature of the soap  
B. To make the soap neutral  
C. To enhance the cleansing power of the soap  
D. To favour the precipitation of the soap [CBSE 2015]
22. A student puts a drop of reaction mixture of a saponification reaction first on a blue litmus paper and then on red litmus paper. He may observe that:  
A. There is no change in blue litmus paper and red litmus paper turns white  
B. There is no change in red litmus paper and blue litmus paper turns red  
C. There is no change in blue litmus paper and red litmus paper turns blue  
D. No change in colour is observed in both the litmus papers [CBSE 2016]
23. For preparing soap in the laboratory we require oil and base. Which of the following combinations of an oil and a base would be best suited for the preparation of soap?  
A. Castor oil and calcium hydroxide  
B. Turpentine oil and sodium hydroxide  
C. Castor oil and sodium hydroxide  
D. Mustard oil and calcium hydroxide [CBSE 2016]
24. In the neighbourhood of your school, hard water required for an experiment is not available. Select from the following groups of salts available in your school, a group each member of which, if dissolved in distilled water, will make it hard:  
A. Sodium chloride, calcium chloride

- B. Potassium chloride, sodium chloride  
C. Sodium chloride, magnesium chloride  
D. Calcium chloride, magnesium chloride [CBSE 2016]
25. A student adds a spoon full of powdered sodium hydrogen carbonate to a flask containing ethanoic acid. List two main observations, he must note in his notebook, about the reaction that takes place. Also write chemical equation for the reaction. [CBSE 2016]
26. When you add a few drops of acetic acid to a test-tube containing sodium bicarbonate powder, which one of the following is your observation ?  
A. No reaction takes place  
B. A colourless gas with pungent smell is released with brisk effervescence  
C. A brown coloured gas is released with brisk effervescence  
D. Formation of bubbles of a colourless and odourless gas [CBSE 2017]
27. While studying the saponification reaction, what do you observe when you mix an equal amount of colourless vegetable oil and 20% aqueous solution of NaOH in a beaker ?  
A. The colour of the mixture has become dark brown  
B. A brisk effervescence is taking place in the beaker  
C. The outer surface of the beaker has become hot  
D. The outer surface of the beaker has become cold [CBSE 2017]
28. A student requires hard water for an experiment in his laboratory which is not available in the neighbouring area. In the laboratory there are some salts, which when dissolved in distilled water can convert it into hard water. Select from the following groups of salts, a group, each salt of which when dissolved in distilled water will make it hard.  
A. Sodium chloride, Potassium chloride  
B. Sodium sulphate, Potassium sulphate  
C. Sodium sulphate, Calcium sulphate  
D. Calcium sulphate, Calcium chloride [CBSE 2017]
29. Mention the essential material (chemicals) to prepare soap in the laboratory. Describe in brief the test of determining the nature (acidic/alkaline) of the reaction mixture of saponification reaction. [CBSE 2017]