

Board – CBSE

Class – 10th

Topic – Carbon & Its Compounds

Q1. What is the difference in the molecular formula of any two consecutive members of a homologous series of organic compounds?

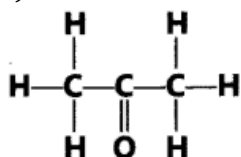
Ans: $-\text{CH}_2-$ is the difference in the molecular formula of any two consecutive members of a homologous series of organic compounds.

Q2. Give a chemical test to distinguish between saturated and unsaturated hydrocarbons.

Ans: Add bromine water. Saturated hydrocarbons do not react whereas unsaturated hydrocarbon will decolorize bromine water.

Q3. (a) Why are covalent compounds generally poor conductors of electricity?

(b) Name the following compound:

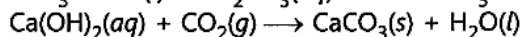
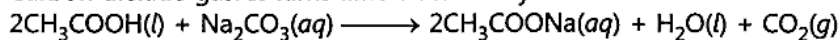


(c) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?

Ans: (a) It is because they do not form ions.

(b) Propanone

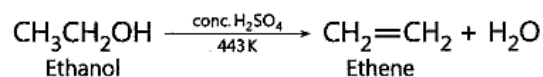
(c) Carbon dioxide gas. It turns lime water milky.



Calcium hydroxide Carbon dioxide Calcium carbonate

Q4. Name the carbon compound which on heating with excess of concentrated sulphuric acid at 443 K gives ethene.

Ans: $\text{CH}_3\text{CH}_2\text{OH}$, ethanol



Q5. What is meant by a saturated hydrocarbon?

Ans: Those hydrocarbons in which valency of carbon are satisfied by single bonds only are called saturated hydrocarbons.

Q6. Give reasons for the following observations:

- (a) The element carbon forms a very large number of compounds.
- (b) Air holes of a gas burner have to be adjusted when the heated vessels get blackened by the flame.
- (c) Use of synthetic detergents causes pollution of water.

Ans: (a) Carbon forms large number of compounds since carbon is small in size and can form stable covalent bonds (catenation) and it shows tetravalency.

(b) Air holes of gas burner are made open (adjusted) so that air can pass through, which is needed for complete combustion, so that heated vessels do not get blackened.

(c) Some synthetic detergents are non-biodegradable, therefore, cause pollution of water.

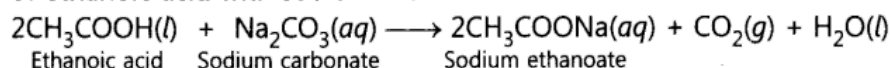
Q7. What is ethanoic acid? Write the formula of the functional group present in this acid.

What special name is given to its 5 – 8% solution in water? How does ethanoic acid react with sodium carbonate? Write a chemical equation of the reaction and common name of the salt produced.

Ans: CH_3COOH is ethanoic acid. $-\text{COOH}$ is the formula of the functional group present in ethanoic acid.

Its 5 to 8% solution in water is called vinegar.

Sodium ethanoate and brisk effervescence due to carbon dioxide gas are formed on reaction of ethanoic acid with sodium carbonate.

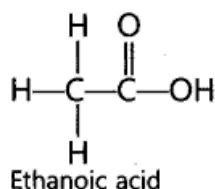


Ethanoic acid Sodium carbonate Sodium ethanoate

The salt produced has common name sodium acetate.

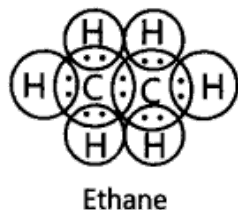
Q8. Draw the structure of CH_3COOH molecule.

Ans:

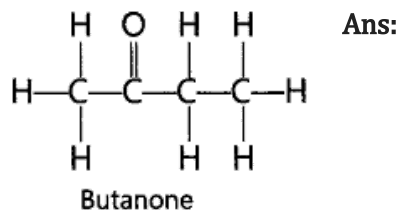


Q9. Write the electron dot structure of ethane molecule (C_2H_6).

Ans:

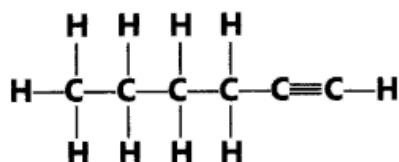


Q10. Draw the structure of butanone molecule, $\text{CH}_3\text{COC}_2\text{H}_5$.



Q11. Name the following compound:

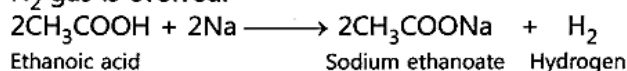
Ans: 1-Hexyne is IUPAC name of the compound.



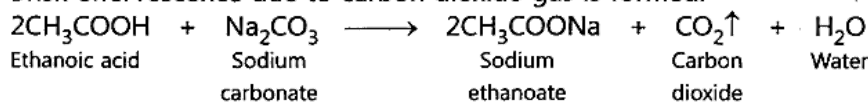
Q12. Write chemical equations for what happens when

- Sodium metal is added to ethanoic acid.
- Solid sodium carbonate is added to ethanoic acid.
- Ethanoic acid reacts with a dilute solution of sodium hydroxide.

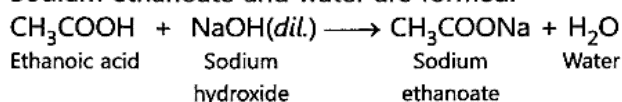
(i) H_2 gas is evolved.



(ii) Brisk effervescence due to carbon dioxide gas is formed.



(iii) Sodium ethanoate and water are formed.



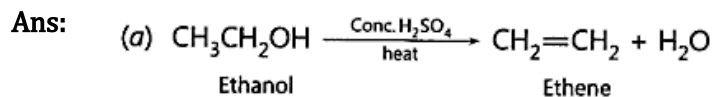
Ans:

Q13. What is meant by a saturated hydrocarbon?

Ans: Those hydrocarbons in which valency of carbon are satisfied by single bonds only are called saturated hydrocarbons.

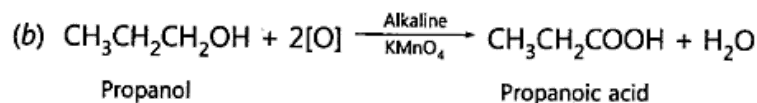
Q14. How would you bring about the following conversions? Name the process and write the reaction involved.

- Ethanol to ethane
- Propanol to propanoic acid



Ethanol Ethene

The reaction is called dehydration.



Propanol Propanoic acid

The reaction is oxidation.

Q15. Catenation is the ability of an atom to form bonds with other atoms of the same element. It is exhibited by both carbon and silicon. Compare the ability of catenation of the two elements. Give reasons.

Ans: Carbon shows catenation to large extent as compared to silicon as well as any other element due to smaller size of carbon. C—C bond is stronger than Si-Si bond because Si is larger in size, forms weaker bond.

Q16. Intake of small quantity of methanol can be lethal. Comment.

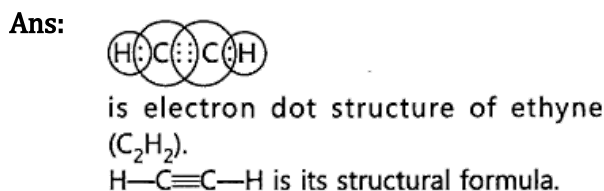
Ans: Methanol is oxidized to methanal in liver. Methanal is highly reactive and good reducing agent. It causes protoplasm to coagulate. It also affects optic nerve and leads to blindness.

Q17. Why detergents are better cleansing agents than soaps? Explain.

Ans: It is because detergents form lot of lather even with hard water.

Hard water contains Ca^{2+} and Mg^{2+} ions which react with soap to form insoluble salts of calcium and magnesium called scum and soap goes waste. Detergents do not form insoluble compounds with Ca^{2+} and Mg^{2+} ions, therefore, these are more effective.

Q18. Draw the electron dot structure of ethyne and also draw its structural formula.



Q19. Why are carbon and its compounds used as fuels for most applications?

Ans: Carbon and its compounds undergo combustion to produce heat; the amount of heat released can be handled and used so they are used as fuels for most applications.

Q20. Explain the formation of scum when hard water is treated with soap.

Ans: Hard water contains salts of calcium and magnesium. When soap molecule comes in contact with these salts it forms a curdy white precipitate (compound insoluble in water) called scum. Soap + Hard water → scum

Q21. What change will you observe if you test soap with litmus paper (red and blue)?

Ans: Soap is alkaline in nature; hence it will turn red litmus into blue, blue litmus will remain blue.

Q22. Would you be able to check if water is hard by using detergent?

Ans: No, because detergent forms lather in both, hard and soft water.

Q23. Why is the conversion of ethanol to ethanoic acid an oxidation reaction?

Ans: Conversion of ethanol to ethanoic acid is an oxidation reaction because oxygen is added to ethanol to convert it to ethanoic acid.

