

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based: Questions with Answers)

GANESH KUMAR

DATE:- 21/07/2020

CARBON AND ITS COMPOUNDS

SHORT ANSWER TYPE QUESTIONS II (3 MARKS)

1. What are esters? How are they prepared? List two uses of esters.

Answer. Esters are organic compounds ($R-COO-R'$) formed by a reaction between an alcohol ($R'-OH$) and an organic acid ($R-COOH$), i.e. carboxylic acid and usually some catalyst with water as a by-product. Esters are used to make perfumes and soap. They are also used to produce pharmaceutical products, cosmetics, plasticizers and detergents.

2. Out of HCl and CH_3COOH , which one is a weak acid and why? Describe an activity to support your answer.

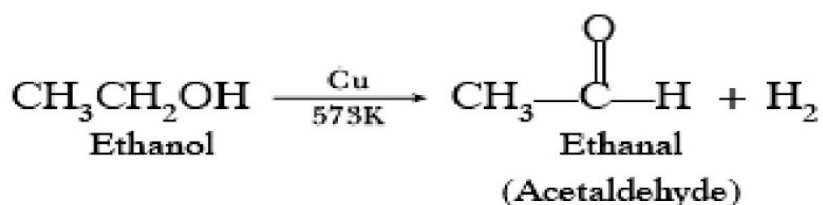
Answer. Acetic acid (CH_3COOH) is a weaker acid because it does not dissociate completely into aqueous solution.

Activity: Add zinc metal in HCl and CH_3COOH respectively. The hydrogen gas will be evolved faster in HCl and slowly in CH_3COOH . It shows acetic acid is a weak acid.

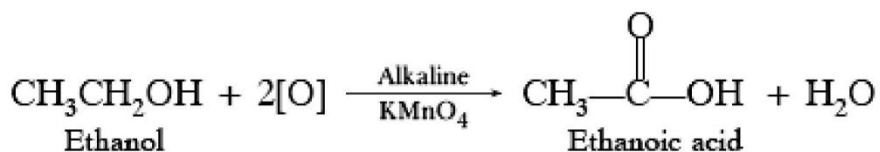
Alternative Method: If we use pH paper, the colour of pH paper will be dark red in HCl and light red in CH_3COOH which shows HCl is strong acid and CH_3COOH is a weak acid.

3. Describe two examples of different oxidations of ethanol. Name the products obtained in each case.

Answer. (i) When ethanol is heated with copper at 573K, ethanal is formed.



(ii) When ethanol is oxidised with alkaline potassium permanganate solution, ethanoic acid is formed.



4. (a) Give chemical tests to detect the presence of

(i) Ethanol

(ii) Ethanoic acid

(b) Why ethanoic acid is called glacial acetic acid?

Answer. (a) Add sodium hydrogen carbonate. Ethanol will not react. Ethanoic acid will give brisk effervescence due to carbon dioxide.

(b) Pure ethanoic acid exist as solid like glaciers at 291 K, therefore, called glacial acetic acid.

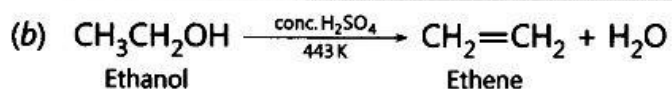
5. List two tests for experimentally distinguishing between an alcohol and a carboxylic acid and describe how these tests are performed.

Answer. (i) NaHCO_3 test: Add sodium hydrogen carbonate to alcohol and a carboxylic acid separately. Alcohol will not react, whereas carboxylic acid will give brisk effervescence. Pass the gas through lime water. It will turn milky.

(ii) Blue litmus test: Add few drops of alcohol and solution of carboxylic acid on blue litmus paper separately. Blue litmus will remain as it is in case of alcohol, whereas it will turn red in carboxylic acid.

6. Distinguish between Esterification and Saponification reactions of organic compounds with the help of the chemical equation for each. What is the use of (i) esters and (ii) Saponification process?

(a) Properties	Ethanol	Ethanoic acid
(i) Physical state	It is liquid with specific smell.	It is also liquid with vinegar like smell.
(ii) Taste	It has burning taste.	It has sour taste.
(iii) NaHCO ₃ test	It does not react.	It gives brisk effervescence due to CO ₂ .
(iv) Ester test	Add acetic acid and conc. H ₂ SO ₄ , pleasant fruity smelling compound, ester is formed.	Add ethyl alcohol and conc. H ₂ SO ₄ , pleasant fruity smelling compound, ester is formed.



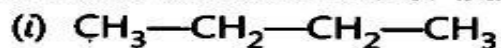
9. Explain isomerism. State any four characteristics of isomers. Draw the structures of possible isomers of butane, C₄H₁₀

Answer. Isomerism is a phenomenon due to which some compounds have same molecular formula but different structural formulae.

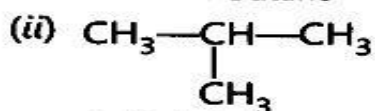
Characteristics:

- (i) They differ in structural formula.
- (ii) They differ in melting point.
- (iii) They differ in boiling point.
- (iv) They differ in solubility in same solvent.

There are two isomers of butane, C₄H₁₀.



n-Butane



2-Methylpropane

10. Give reasons for the following:

- (i) Element carbon forms compounds mainly by covalent bonding.
- (ii) Diamond has a high melting point.
- (iii) Graphite is a good conductor of electricity.
- (iv) Acetylene burns with a sooty flame.
- (v) Kerosene does not decolourise bromine water while cooking oils do.

Answer:-

- (i) It is because carbon has four valence electrons, it cannot gain or lose four electrons because high energy is needed. It can only share four electrons.
- (ii) It is due to strong covalent bonds and compact structure of diamond.
- (iii) It is due to presence of free electrons in graphite because each carbon is linked to three more carbon atoms.
- (iv) It is due to high percentage of carbon, it burns with sooty or smoky flame.
- (v) Kerosene oil is mixture of saturated hydrocarbons therefore does not decolourise bromine water.
