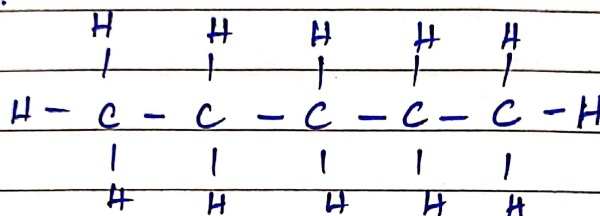


4. Carbon and its compoundsAnswer the following: (VSA)

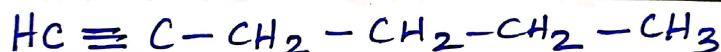
1. (a) How many covalent bonds are present in C_5H_{12} ?
- (b) Write the molecular formula of an alkyne containing 10 atoms of hydrogen.

Ans:

- (a) There are 16 covalent bonds present in C_5H_{12} .



- (b) C_6H_{10}

SHORT ANSWERS :

2. Give reasons for the following:
- (a) Element carbon forms compounds mainly by covalent bonding.
- (b) Graphite is a good conductor of electricity.
- (c) Kerosene does not decolourise bromine water while cooking oils do.

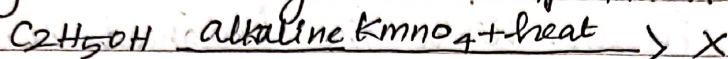
Ans:

- (a) 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.

(b) It is due to presence of free electrons in graphite because each carbon is linked to three more carbon atoms.

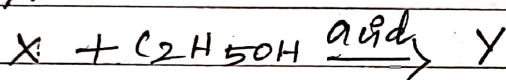
(c) Kerosene oil is mixture of saturated hydrocarbons therefore does not decolourise bromine water.

3. Ethanol (C_2H_5OH) is heated with alkaline potassium permanganate to give a compound X.



(a) How many carbon atoms will compound X contain?

(b) Compound X is now reacted with ethanol in the presence of an acid catalyst to give a compound Y.



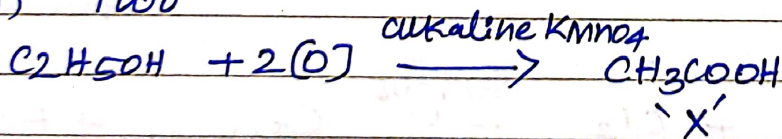
(i) Name the type of compound formed in the above reaction with respect to the functional group it contains.

(ii) State one characteristic property of compounds of the type of compound Y.

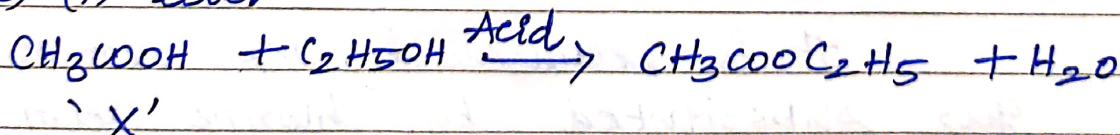
(iii) State one use of compounds of this type.

Ans:

(a) Two



(b) (i) ester



(ii) Esters are pleasant fruity smelling compounds in ice creams, cold drinks etc.

- (iii) * perfumes
* flavouring agents in icecreams, cold drinks etc.

Long Answers :

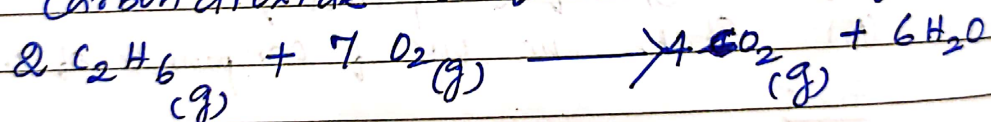
4. (a) Give a chemical test to distinguish between Saturated and unsaturated hydrocarbons.
(b) Name the products formed when ethane burns in air. Write the balanced chemical equation for the reaction showing the types of energies liberated.
(c) Why is reaction between methane and chlorine in the presence of sunlight considered a substitution reaction?

Ans :

- (a) Add bromine water :

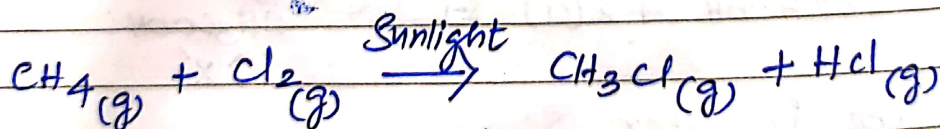
Unsaturated hydrocarbons will decolourise bromine water whereas saturated hydrocarbons will not react.

- (b) Carbon dioxide and water are formed.



+ Heat + Light

(c)

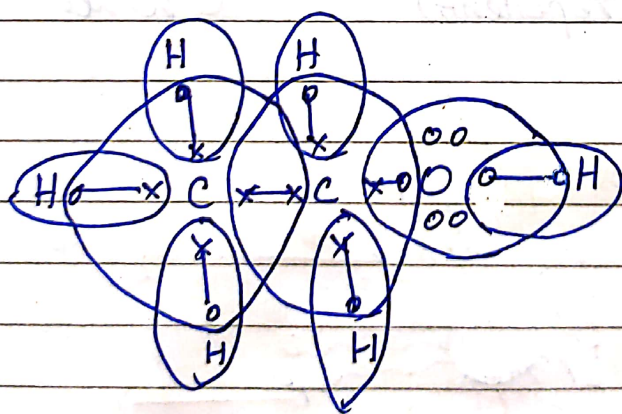
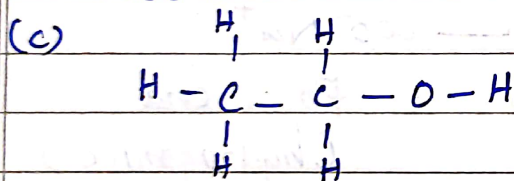


It is because hydrogen atom of methane gets substituted by chlorine atom to form chloromethane, therefore, it is called substitution reaction.

5. (a) It is observed that covalent compounds are bad conductor of electricity. Give reason.
 (b) Carbon can neither form C^{4+} cation and C^{4-} anion. Explain.
 (c) Draw electron dot structure of ethanol.
 (d) Identify the heteroatom(s) in the following compounds.
 (i) $CH_3-CH_2-\overset{\overset{O}{\parallel}}{C}-CH_3$ (ii) CH_3-CH_2Cl .

Ans:

- (a) It is because covalent compounds do not form ions therefore do not conduct electricity.
 (b) Carbon cannot lose 4 electrons to form C^{4+} cation because very large amount of energy is required. It cannot gain 4 electrons to form C^{4-} anion because 6 protons cannot hold 10 electrons.



- (d) (i) Oxygen
 (ii) chlorine

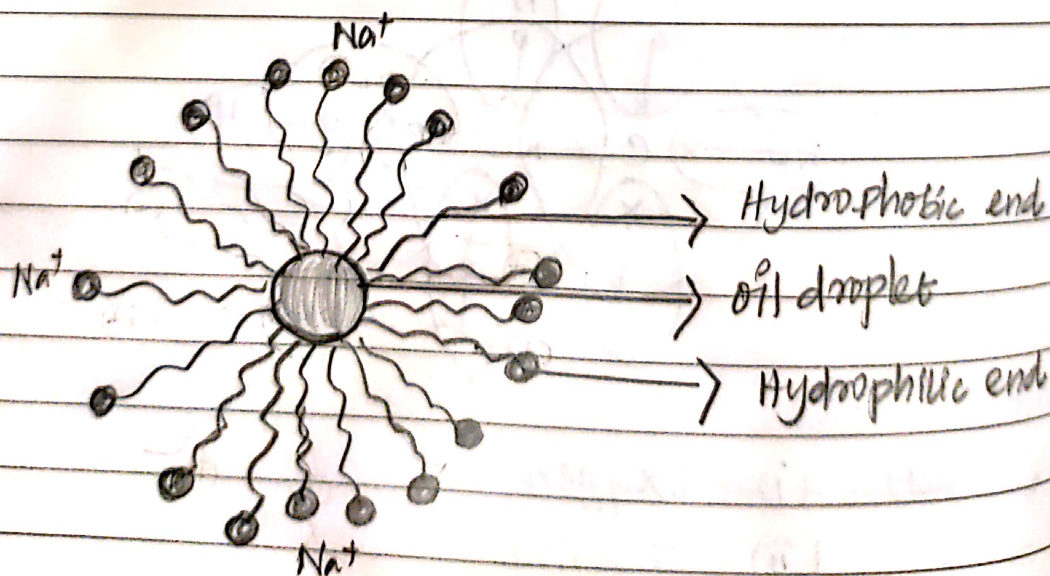
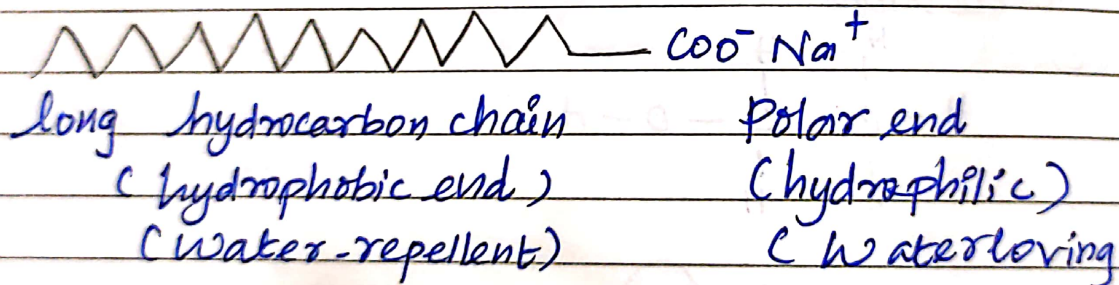
- b. Write the mechanism of the cleaning action of soaps. why do soaps not form lather (foam) with hardwater? Mention any two problems that arise due to the use of detergents instead of soaps.

Ans:

Soaps are Sodium or potassium salts of fatty acids having COONa group. Detergents are Sodium or potassium salts of Sulphonic acids having SO_3Na and SO_4Na group.

Cleaning Action of Soap:

Soaps consist of a long hydrocarbon tail which is hydrophobic (water-hating or water repelling) with a negatively charged head which is hydrophilic (water-loving) as shown in figure.



When a soap is dissolved in water, the molecules associate together as clusters called micelles in which, water molecules being polar in nature, surround the ions and the hydrocarbon part of the molecule attracts grease, oil and dirt.

Hard water has Ca^{2+} and Mg^{2+} ions that react with soap to form insoluble compound and soap goes waste.

Disadvantages of Detergents

- (i) Detergents are expensive.
- (ii) Many detergents are branched chain hydrocarbon which are not Biodegradable and create water pollution.