Carbon and Its Compounds: In-Text Questions

[Page no-61]

Q.1 What would be the electron dot structure of carbon dioxide which has the formula CO₂? Sol. The electron dot structure of carbon dioxide which has the formula CO₂



Q.2 What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur? (Hint – The eight atoms of sulphur are joined together in the form of a ring.)

Sol. The electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur:



[Page no-68]

Q.1 How many structural isomers can you draw for pentane?

Sol. We can draw three structural isomers for pentane: n-pentane, Iso-pentane and neo-pentane. Their Structures are:

 $\begin{array}{c} CH_{3}\\ CH_{3}-CH_{2}-CH-CH_{3}\\ \\ CH_{3}\\ CH_{3}\\ Iso - pentane \end{array} \xrightarrow{\begin{array}{c} CH_{3}\\ \\ CH_{3}\\ \\ CH_{3}\\ \end{array}} \xrightarrow{\begin{array}{c} CH_{3}\\ \\ CH_{3}\\ \\ CH_{3}\\ \end{array}}$

Neo-pentane

 $CH_3 - CH_2 - CH_2 - CH_2 - CH_3$

Q.2 What are the two properties of carbon which lead to the huge number of carbon compounds we see around us?

Sol. Carbon can form lots of carbon compounds because of the following properties:

n-pentane

(a) Catenation: Carbon can make covalent bond with other carbon atoms. This property is called catenation. Due to this property, carbon can form long chains, branched chains and closed chains.

(b) Carbon have tertravalency. So, it can share four electrons to form compounds with elements of many other elements.

Q.3 What will be the formula and electron dot structure of cyclopentane? Sol. Formula of cyclopentane: C_5H_{10}





(i) Ethanoic Acid



(ii) Bromopentane

H н H H Η Т L L Г L CH3 CH2 CH2 CH2 CH2 Br H - cc-- Br L L L L L Η Н н Н Н H Η Η Η Η L L L L L н-с. с с с с-н L I L T I H H H Br H Η Η Η H Η L L L L L Н с-н L L L L L Η H Н Br Η

Yes, structural isomers are possible for bromopentane

(iii) Butanone

(iv) Hexanal

Q.5 How would you name the following compounds?

(i)
$$CH_3 - CH_2 - Br$$
 (ii) $H - C = O$

Sol.

(i) Bromoethane There is a halogen group (bromine; Prefix-Bromo).
(ii) Methanal or formaldehyde

an aldehyde group (-CHO) is present in this compound.

(iii) Hexyne

A triple bond is present in the compound.

[Page no-71]

Q.1 *Sol*.

Why is the conversion of ethanol to ethanoic acid an oxidation reaction? The conversion of ethanol to ethanoic acid is:

 $\begin{array}{rrr} CH_3CH_2OH & + & 2[O] & \xrightarrow{Alkaline \ KMnO_4} \\ \hline or \ Acidified \ K_2Cr_2O_7 \end{array}$

CH₃COOH Ethanoic acid

Since, in this reaction, oxygen is added to form ethanol, so it is an oxidation reaction.

Q.2 A mixture of oxygen and ethyne is burnt for welding. Can you tell why a mixture of ethyne and air is not used?

Sol. When the mixture of oxygen and ethyne is burnt, it gives a clean flame with high temperature because of complete combustion. But when ethyne is burnt with air, incomplete combustion takes place. Incomplete combustion will not give a high temperature and also give a sooty flame. This is the reason, oxygen is used instead of air to burn ethyne.

[Page no-74]

Q.1 How would you distinguish experimentally between an alcohol and a carboxylic acid? *Sol*. When carboxylic acid reacts with carbonate or hydrogen carbonate, it gives out carbon dioxide with brisk effervescence which turns lime water milky. While, alcohol does not react with carbonate or hydrogen carbonate. Thus, by the reaction with carbonate or hydrogen carbonate, we can distinguish between carboxylic acid and alcohol.

Q.2 What are oxidising agents?

Sol. Substances which give oxygen to other compounds or remove hydrogen on reaction from other compounds are called oxidising agents. Example: Potassium permanganate ($KMnO_4$).

[Page no-76]

Q.1 Would you be able to check if water is hard by using a detergent?

Sol. By using a detergent, we would not able to check if water is hard because detergent forms lather with both hard and soft water. They do not form insoluble calcium or magnesium salt (scum). While a soap gives lather with soft water only.

Q.2 People use a variety of methods to wash clothes. Usually after adding the soap, they 'beat' the clothes on a stone, or beat it with a paddle, scrub with a brush or the mixture is agitated in a washing machine. Why is agitation necessary to get clean clothes?

Sol. When clothes are put in the soapy solution, the hydrophobic ends of soap molecules surround a particle of grease or dirt and converge in a typical fashion to make a structure, is called micelle. Molecules of soap form micelles with dirt and remain suspended as colloid. To remove this dirt in the form of micelles from clothes agitation is required to get clean clothes.