

SCIENCE

CLASS -X

CHAPTER - 4

Carbon and its Compounds

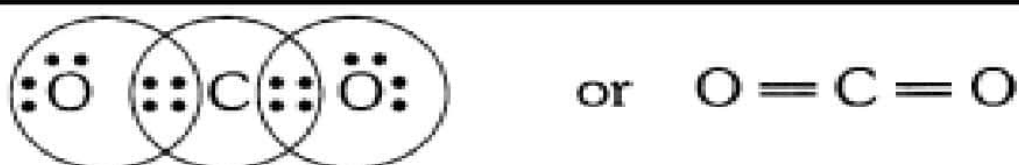
Questions & Answers

Page Number: 61

Question 1:

What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?

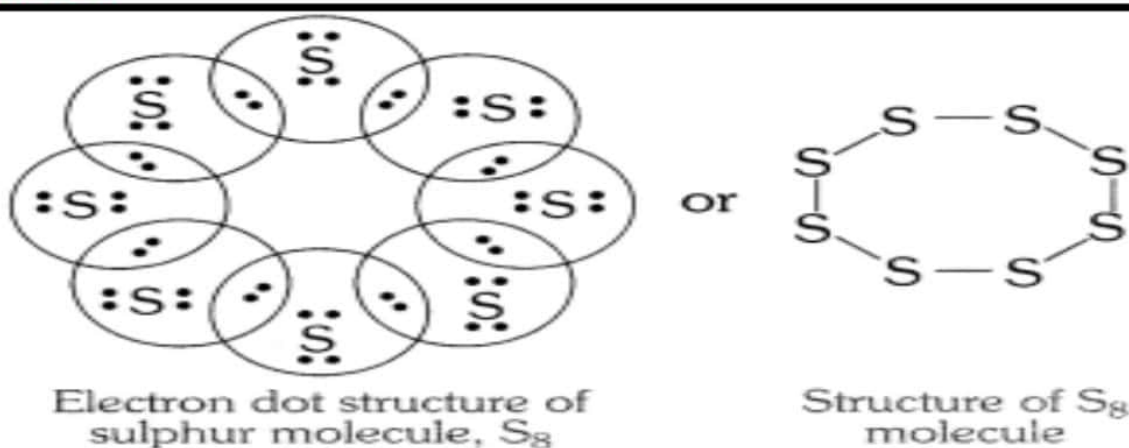
Answer:



Question 2:

What would be electron dot structure of sulphur which is made up of eight atoms of sulphur.

Answer:

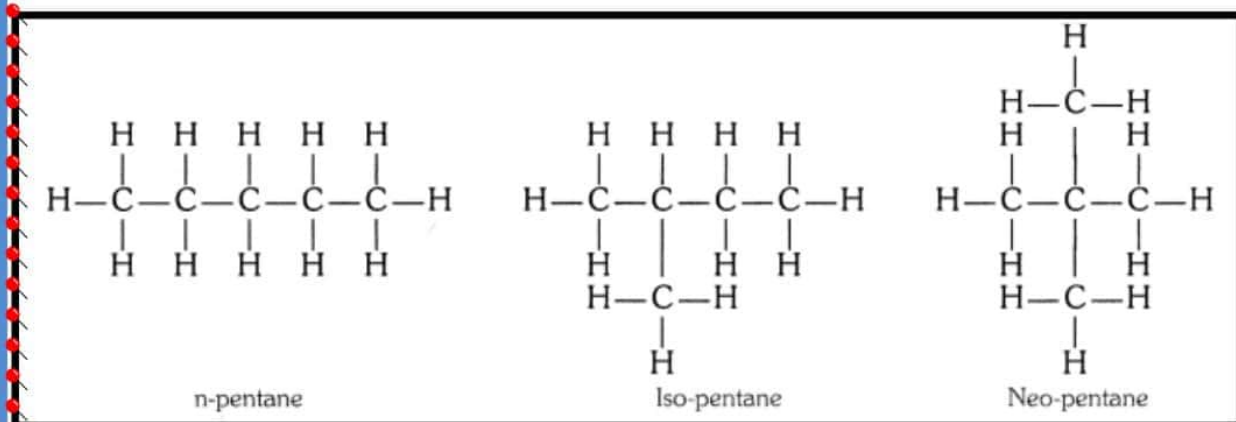


Page Number: 68-69

Question 1 : How many structural isomers can you draw for pentane ?

Answer:

Three, these are n-pentane, iso-pentane and neo-pentane.



Question 2:

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

Answer:

- (i) Tetravalency
- (ii) Catenation.

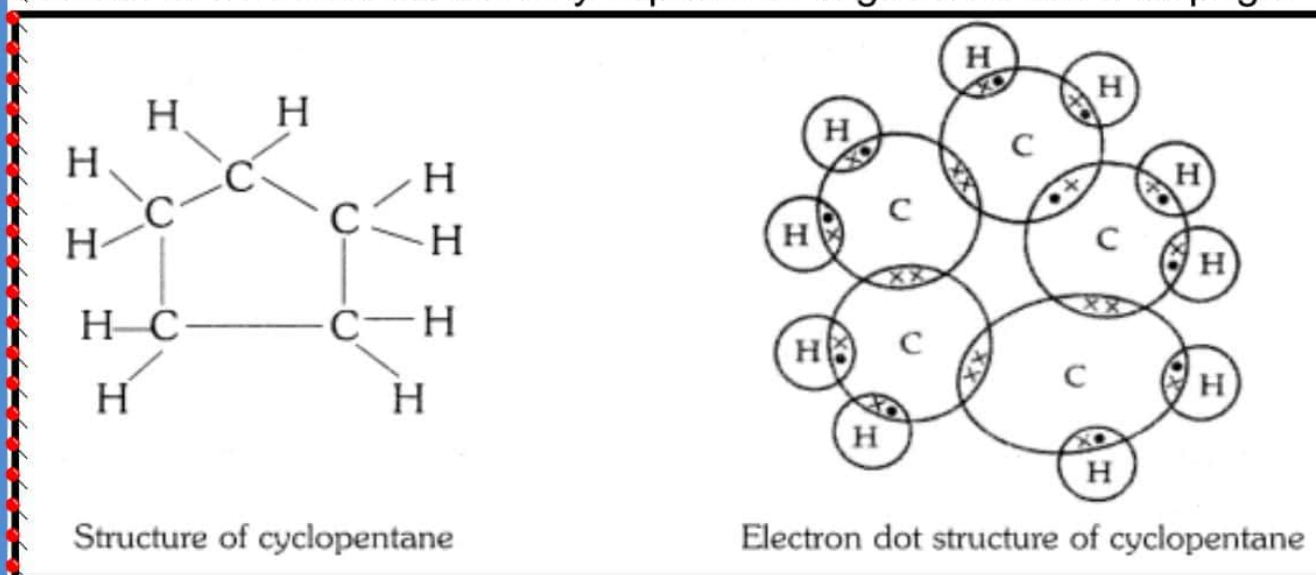
Question 3:

What will be the formula and electron dot structure of cyclopentane ?

Answer:

The molecular formula of cyclopentane is C_5H_{10} .

The electron dot structure of cyclopentane is given on the next page.

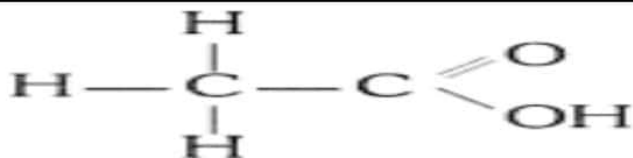


Question 4: Draw the structures for the following compounds :

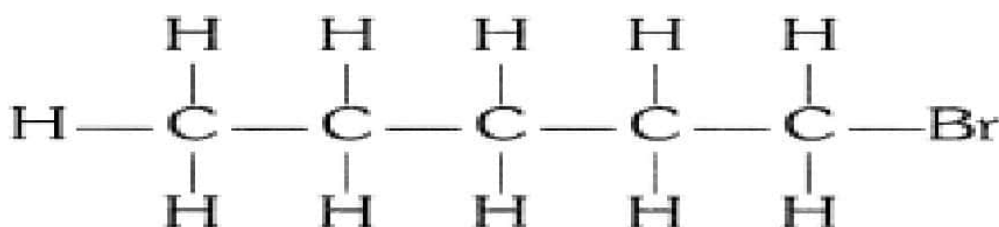
- (i) Ethanoic acid
- (ii) Bromopentane
- (iii) Butanone
- (iv) Hexanal

Answer:

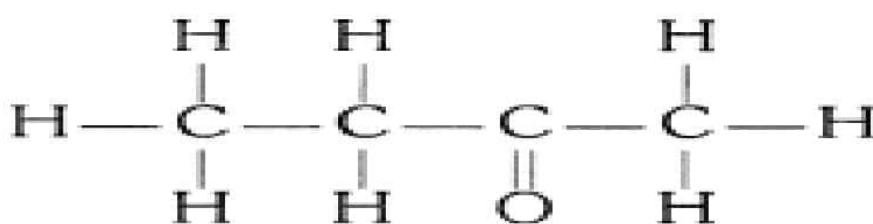
- (i) Ethanoic acid (CH_3COOH)



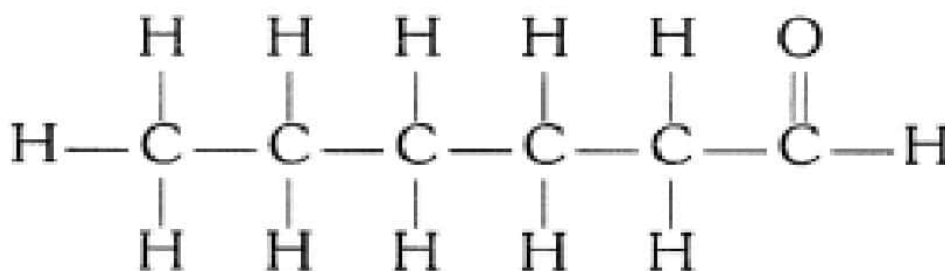
- (ii) Bromopentane ($\text{C}_5\text{H}_{11}\text{Br}$)



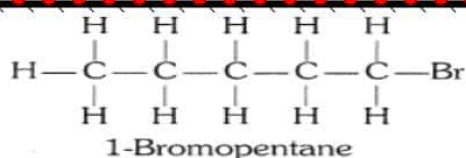
- (iii) Butanone ($\text{CH}_3 - \text{CH}_2 - \text{COCH}_3$)



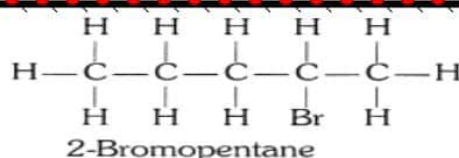
- (iv) Hexanal ($\text{C}_5\text{H}_{11}\text{CHO}$)



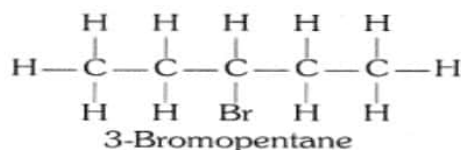
Structural isomers for bromopentane: There are three structural isomers for bromopentane depending on the position of Br at carbon 1, 2, 3.



1-Bromopentane



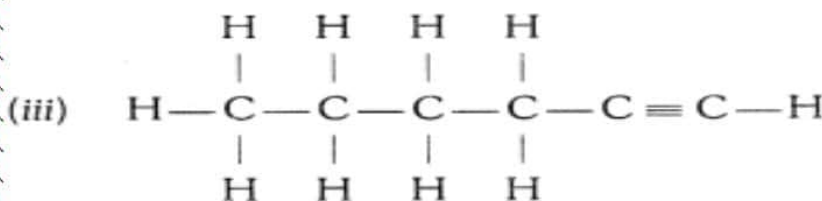
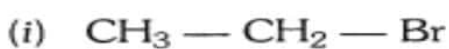
2-Bromopentane



3-Bromopentane

Positions 4 and 5 are same as 1, 2.

Question 5: How would you name the following compounds ?



Answer:

(i) Bromoethane

(ii) Methanal

(iii) 1 - Hexyne

EXERCISES:

Question 1: Ethane, with the molecular formula C_2H_6 has

- (a) 6 covalent bonds
- (b) 7 covalent bonds
- (c) 8 covalent bonds
- (d) 9 covalent bonds

Answer:

(b) 7 covalent bonds.

Question 2: Butanone is a four-carbon compound with the functional group

- (a) carboxylic acid
- (b) aldehyde
- (c) ketone
- (d) alcohol

Answer:

(c) Ketone.

Question 3: While cooking, if the bottom of the vessel is getting blackened on the outside, it means that

- (a) the food is not cooked completely.
- (b) the fuel is not burning completely.
- (c) the fuel is wet.
- (d) the fuel is burning completely.

Answer:

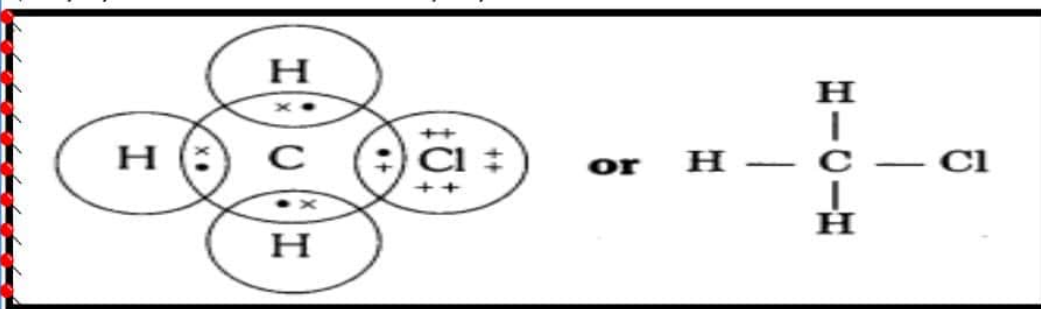
(b) The fuel is not burning completely.

Question 4: Explain the nature of the covalent bond using the bond formation in CH_3Cl .

Answer:

Covalent bond is formed by sharing of electrons so that the combining atoms complete their outermost shell.

In CH_3Cl : C = 6, H = 1 and Cl = 17 And their electronic configuration is C – 2, 4, H – 1 and Cl – 2, 8, 7



Three hydrogen atoms complete their shells by sharing three electrons (one electron each) of carbon atom.

Chlorine completes its outer shell by sharing its one out of seven electrons with one electron of carbon atom.

Thus carbon atom shares all its four electrons with three hydrogen atoms and one of chlorine atom and completes its outermost shell and single covalent bonds are formed in CH_3Cl .

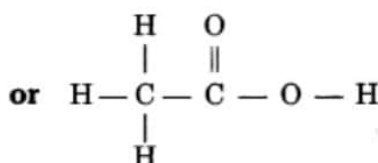
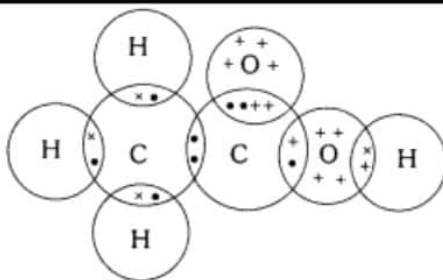
Question 5: Draw the electron dot structures for

- (a) ethanoic acid
- (b) propanone
- (c) H_2S

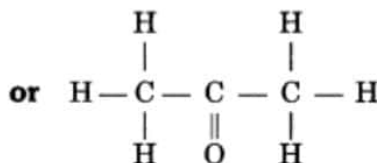
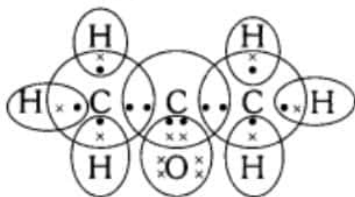
(d) F_2 .

Answer:

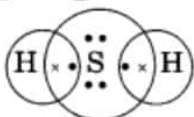
(a) **Ethanoic acid:**



(b) **Propanone :**

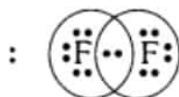


(c) **Hydrogen sulphide (H_2S) :**



or $H-S-H$

(d) **Fluorine (F_2)**



or $F-F$

Question 6: What is a homologous series ? Explain with an example.

Answer:

Homologous series : A homologous series is a group of organic compounds having similar structures and similar chemical properties in which the successive compounds differ by $-CH_2$ group.

Characteristics of homologous series :

- (i) All members of a homologous series can be represented by the same general formula. For example, the general formula of the homologous series of alkanes is C_nH_{2n+2} , in which 'n' denotes number of carbon and hydrogen atoms in one molecule of alkane.
- (ii) Any two adjacent homologues differ by one carbon atom and two hydrogen atoms in their molecular formulae.
- (iii) The difference in the molecular masses of any two adjacent homologues is 14u.
- (iv) All the compounds of a homologous series show similar chemical properties.
- (v) The members of a homologous series show a gradual change in their physical properties with increase in molecular mass.

For example, general formula of the homologous series of alkanes is C_nH_{2n+2} , in which 'n' denotes number of carbon atoms in one molecule of alkane. Following are the first five members of the homologous series of alkanes (general formula C_nH_{2n+2}).

Value of n	Molecular formula	Name of compound
1	CH_4	Methane
2	C_2H_6	Ethane
3	C_3H_8	Propane
4	C_4H_{10}	Butane
5	C_5H_{12}	Pentane

Question 9: Why are carbon and its compounds used as fuels for most applications ?

Answer:

Carbon and its compounds give a large amount of heat per unit weight and are therefore, used as fuels for most applications.

******Thanks******

By Priyanka Jha