Topics: Carbon and its Compounds

Subtopics: Bonding in Carbon - the Covalent Bond,Versatile Nature of Carbon
Types of Hydrocarbons

Questions

Q1.What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?

Q2.What would be the electron dot structure of sulphur which is made up of eight atoms of sulphur?

Q3.What are the two properties of carbon which lead to the huge number of carbon compounds we see around us ?

Q4.What will be the formula and electron dot structure of cyclopentane ?

Q5.Draw the electron dot structures for

(a) H_2S

(b) F_2.

Q6.What is an unsaturated hydrocarbon? Give two examples.

Q7.Diamond is a poor conductor of electricity while graphite is a good conductor. Give reason.

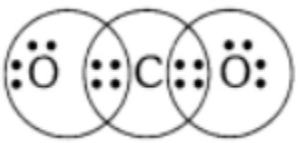
Q8.Define structural isomer and draw the isomeric structures of butane.

Q9.What are hydrocarbons? Give examples.

Q10. Give the structural differences between saturated and unsaturated hydrocarbons with two examples each.

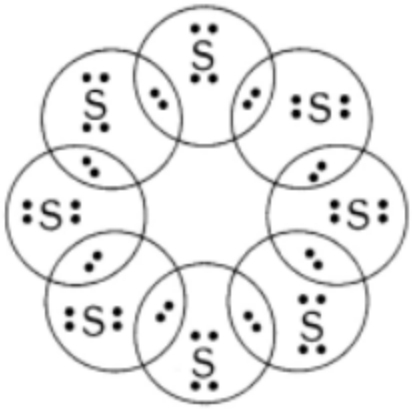
Answers

1.



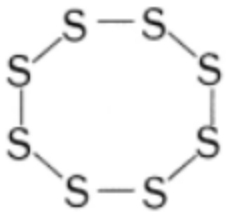
or $O=C=O$

2.



Electron dot structure of sulphur molecule, S_8

or



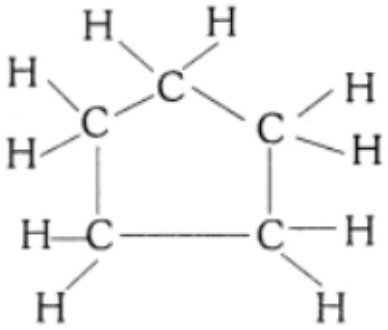
Structure of S_8 molecule

3.The two properties of carbon which lead to the huge number of carbon compounds we see around us :

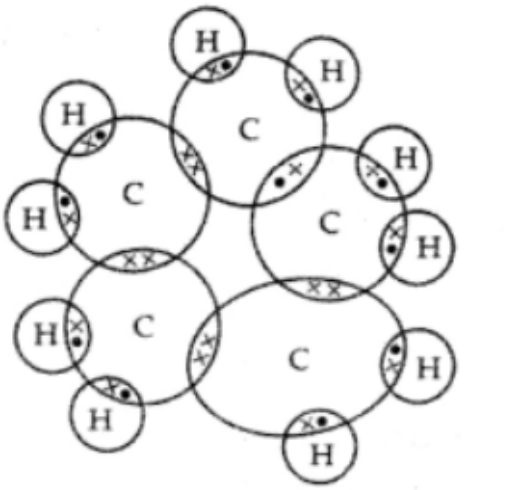
(i) Tetravalency

(ii) Catenation.

4.The molecular formula of cyclopentane is C_5H_{10} .

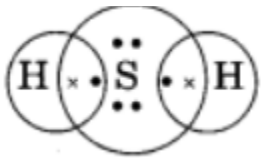


Structure of cyclopentane



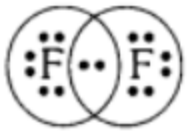
Electron dot structure of cyclopentane

5.a)



or **H–S–H**

b)

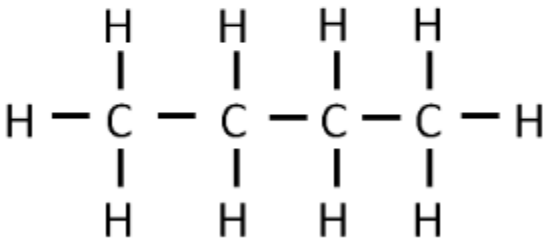


or **F–F**

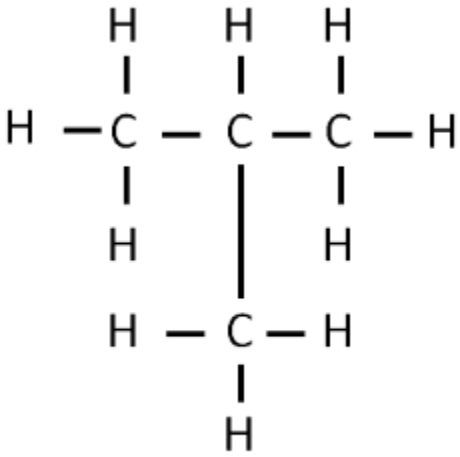
6.A hydrocarbon in which at least two carbon atoms are joined by a double (=) or a triple (≡) bond, is called an unsaturated compound.
e.g. ethane and ethyne (or acetylene) are unsaturated hydrocarbons.

7.In diamond, all the four valence electrons of carbon are involved in the formation of covalent bonds. Thus, no free electrons are available to conduct electricity. Whereas, in graphite, three electrons in the valence shell of carbon are involved in the formation of covalent bond. The fourth electron is free to move. So,it conducts electricity.

8.Compounds having same molecular formula but different structural formula are called structural isomers.
e.g. butane (C_4H_{10}) shows the following two structural isomers. One of which is straight chain n-butane and other is iso-butane.



Butane C_4H_{10}



Iso-Butane C_4H_{10}

9.

The compounds that are made up of carbon and hydrogen atoms are called hydrocarbons, e.g. methane (CH_4), ethane ($CH_2 = CH_2$). Ethyne (C_2H_2), cyclohexane (C_6H_{12}), benzene (C_6H_6)etc.

10.

In saturated hydrocarbons, all the four valencies of carbon are satisfied by a single covalent bond while in unsaturated hydrocarbons, double or triple bonds are required to satisfy the valencies of carbon, e.g.

a. Saturated hydrocarbons

   Methane (CH_4), Ethane ($CH_3 — CH_3$)

b. Unsaturated hydrocarbons

   Ethene ($H_2C = CH_2$), Ethyne ($HC \equiv CH$)