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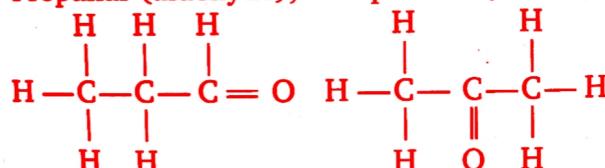
**TURN ON  
NOTIFICATIONS**



**/padhle.akshay**

**Q.1. An aldehyde as well as a ketone can be represented by the same molecular formula, say C<sub>3</sub>H<sub>6</sub>O. Write their structure and name them. State the relation between the two in the language of science.** [CBSE (AI) 2016]

**Ans.** Propanal (aldehyde); Propanone (ketone)



These two compounds are called isomer i.e., compounds having same molecular formula but different structural formula.

**Q.2. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties.** [CBSE 2016]

**Ans.** Covalent compounds are those compounds which are formed by sharing of electrons between two atoms. Covalent compounds are different from ionic compounds because the ionic compounds are formed by the transference of electrons.

Three characteristics of covalent compounds are follows: as

- (i) They generally have low melting and boiling points.
- (ii) They generally insoluble or less soluble in water but soluble in organic solvents.
- (iii) They do not conduct electricity.

**Q.3. Write the name and molecular formula of an organic compound having its name suffixed with 'ol' and having two carbon atoms in its molecule. Write balanced chemical equation to indicate what happens when this compound is heated with excess conc. H<sub>2</sub>SO<sub>4</sub> and the name of main product formed. Also state the role of conc. H<sub>2</sub>SO<sub>4</sub> in the reaction.** [CBSE (F) 2016]

**Ans.** The compound is ethanol. Its formula is C<sub>2</sub>H<sub>5</sub>OH or C<sub>2</sub>H<sub>6</sub>O



Conc. H<sub>2</sub>SO<sub>4</sub> acts as a dehydrating agent.

**Q.4. Catenation is the ability of an atom to form bonds with other atoms of the same element. It is exhibited by both carbon and silicon. Compare the ability of catenation of the two elements. Give reasons.** [CBSE 2012]

**Ans.** Carbon exhibits catenation much more than silicon or any other element due to its smaller size which makes the C-C bonds strong while the Si-Si bonds are comparatively weaker due to its large size.

**Q.5. List four characteristics of homologous series.**

[CBSE 2014]

- (i) Same functional group.
- (ii) Similar chemical properties.
- (iii) Regular gradation in physical properties.
- (iv) Successive member differ by -CH<sub>2</sub>unit / 14u.

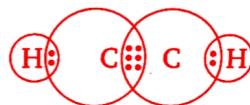
## Q.6. Carbon does not form ionic compounds. Why?

[CBSE 2013,15]

Ans. In order to form ionic bond carbon either should loose  $4e^-$  or gain  $4e^-$  to form  $C^{4+}$  or  $C^{4-}$  ion. Loosing  $4e^-$  needs large amount of energy and by gaining  $4e^-$ , it will have  $10e^-$ . It is difficult for 6 protons to hold  $10e^-$ . So  $C^{4+}$  and  $C^{4-}$  is not possible.

## Q.7. Draw the electron-dot structure for ethyne. A mixture of ethyne and oxygen is burnt for welding. In your opinion, why cannot we use a mixture of ethyne and air for this purpose? [CBSE 2015]

Ans.  $H:C\ddot{C}:H$  or



In pure oxygen, ethyne undergoes complete combustion and high temperature suitable for welding is attained.

Whereas air contains less percentage/amount of oxygen results in incomplete combustion of ethyne and the temperature required for welding is not attained.

## Q.8. What is meant by homologous series of carbon compounds? Classify the following carbon compounds into two homologous series and name them.

$C_3H_4$ ,  $C_3H_6$ ,  $C_4H_6$ ,  $C_4H_8$ ,  $C_5H_8$ ,  $C_5H_{10}$

[CBSE 2014,15]

Ans. A group of organic compounds having the same functional group and similar structures in which the successive members differ by  $-CH_2$  group.

$C_3H_4$ ,  $C_4H_6$ ,  $C_5H_8$ : Alkynes

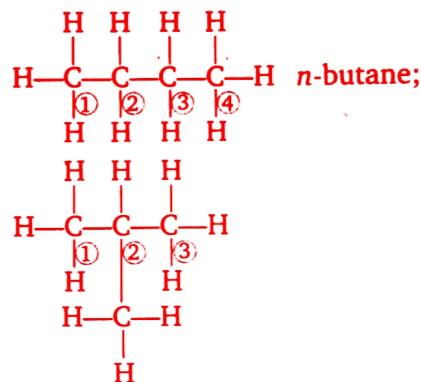
$C_3H_6$ ,  $C_4H_8$ ,  $C_5H_{10}$ : Alkenes

## Q.9. Define the term 'structural isomerism'. Explain why propane cannot exhibit this property. Draw the structures of possible isomers of butane, $C_4H_{10}$ . [CBSE 2014]

Ans. (i) The phenomenon due to which two or more such compounds exist which have same molecular formula but different structures.

(ii) Propane cannot exhibit this property, because due to lesser number of carbon atoms, it can form only one combination of atoms.

(iii) Isomers of butane:



Q.10.  $C_3H_6$ ,  $C_4H_8$  and  $C_5H_{10}$  belong to the same homologous series.

(i) Why the melting and boiling points of  $C_5H_{10}$  is higher than  $C_4H_8$ ?

(ii) Arrange these hydrocarbons in order of increasing boiling points. [CBSE 2016]

Ans. (i) Because molecular mass of  $C_5H_{10}$  molecule is more than  $C_4H_8$ .

(ii)  $C_3H_6 < C_4H_8 < C_5H_{10}$ .

### **Q.11. State reasons to explain why covalent compounds**

- (i) are bad conductors of electricity?**
- (ii) have low melting and boiling points?**

[CBSE 2016]

**Ans. (i)** Covalent compounds are bad conductors of electricity, because the bonding in these compounds does not give rise to any ions.

**(ii)** Covalently bonded molecules have strong bonds within the molecule, but intermolecular forces are small, so they have low melting and boiling points.

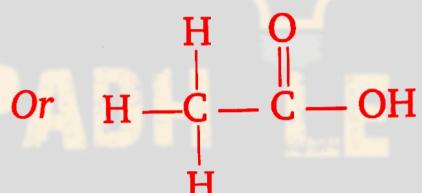
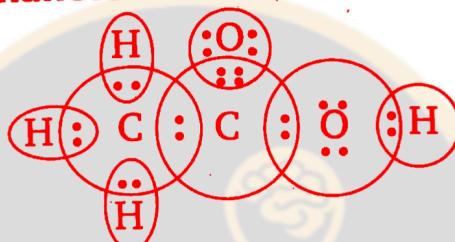
### **Q.12. Draw the electron dot structures for**

- (i) ethanoic acid (iii) propanone**
- (ii) H<sub>2</sub>S**
- (iv) F<sub>2</sub>**

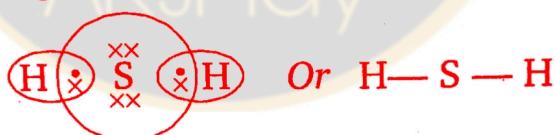
[CBSE 2013,17]

**Ans. Electron dot structure for :**

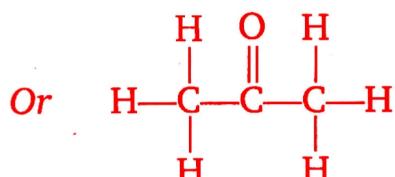
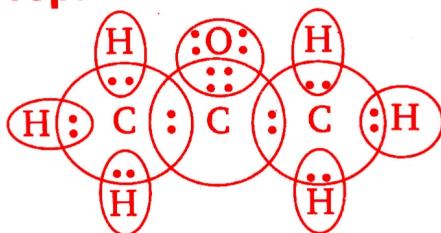
#### **(i) Ethanoic acid**



#### **(ii) Hydrogen sulphide (H<sub>2</sub>S)**



#### **(iii) Propanone**



#### **(iv) F<sub>2</sub> (Fluorine molecule)**



**Q.13. How many structural isomers can you draw for pentane?**

[CBSE 2011,13]

**Ans. Three structural isomers can be drawn for pentane as shown in the table..**

S. No.	Structure	Common Name	IUPAC Name
1.	$\begin{array}{cccccc} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \\ &   &   &   &   &   \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\ &   &   &   &   &   \\ & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	$n$ -pentane	Pentane
2.	$\begin{array}{ccccc} & \text{H} & \text{H} & \text{H} & \text{H} \\ &   &   &   &   \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & -\text{C}-\text{H} \\ &   &   &   &   \\ & \text{H} & \text{H} & \text{H} & \text{C}-\text{H} \\ & & & &   \\ & & & & \text{H} \end{array}$	Iso-pentane	2-Methyl-butane
3.	$\begin{array}{ccccc} & & \text{H} & & \\ & &   & & \\ & & \text{H}-\text{C} & -\text{H} & \\ & &   & & \\ & & \text{H} & & \\ & &   & & \\ \text{H} & -\text{C} & -\text{C} & -\text{C}-\text{H} & \\ &   &   &   &   \\ & \text{H} & \text{H} & \text{H} & \text{C}-\text{H} \\ & & & &   \\ & & & & \text{H} \end{array}$	Neo-pentane	2,2-Dimethyl-propane

**Q.1. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write chemical equation and name of the product formed when this compound with**

- (i) sodium metal  
(ii) hot concentrated sulphuric acid

Or  
**What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound. Why are such compounds?**

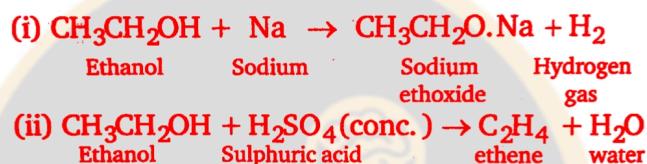
- (i) Poor conductors of electricity and  
(ii) Have low melting and boiling points? What happens when this compound burns in oxygen?

[CBSE 2019]

**Ans. Name of the compound which is the active ingredient of all alcoholic drinks is Ethanol, and its chemical formula is CH<sub>3</sub>CH<sub>2</sub>OH** Uses :

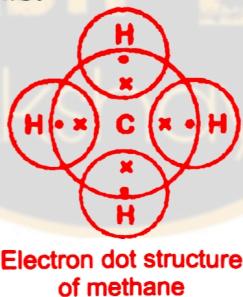
- (1) Ethanol is used in medical wipes/swabs and antibacterial hand sanitizers.  
(ii) Ethanol is also used in body lotions as preservatives ingredients. and stabilizer of its

#### Chemical reactions of ethanol



Or

Methane is a colourless, odourless and highly flammable gas which is the main component of natural gas It is also called marsh gas as it is produced when vegetation decomposes naturally in any swampy or marshlands.



**Electron Dot structure of methane : The type of bonds present in methane are all covalent bonds between four hydrogen atoms and the single carbon atom at the center of the molecule.**

- (i) Methane is a poor conductor of electricity because in methane all bonds are covalent bonds and therefore no free electrons are present in the molecule that can help in the conduction of electricity.  
(ii) Covalent compounds have low intermolecular forces of attraction between the molecules and thus show low melting and boiling points. Since, methane is also a covalent compound thus methane has very low melting and low boiling point.

**When methane is burned in the presence of Oxygen it forms Carbon dioxide gas and water as a product of the reaction.**



**Q.2. (a) Define homologous series of organic compounds. Mention any two characteristics of homologous series.**

**(b) Describe a chemical test to distinguish between ethanol and ethanoic acid.**

**(c) Identify functional group in Pentanone.**

**Ans. (a) Homologous series is a series of compounds in which the same functional group substitutes for hydrogen in a carbon chain.**

### **Characteristics**

**(i) All the members have similar chemical properties.**

**(ii) There is a gradation in physical properties.**

**(b) On adding solid NaHCO<sub>3</sub> (Sodium bicarbonate) an effervescence occurs with the evolution of CO<sub>2</sub> in case of ethanoic acid while ethanol does not show any action.**

**[CBSE 2019]**

**(c) Ketone.**

**Q.3. 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.)**

**Ans. A sulphur molecule with 8 atoms of sulphur has a Crown shape or Puckered Ring Structure. In the electron dot structure of S<sub>8</sub> molecule, each sulphur atom has :**

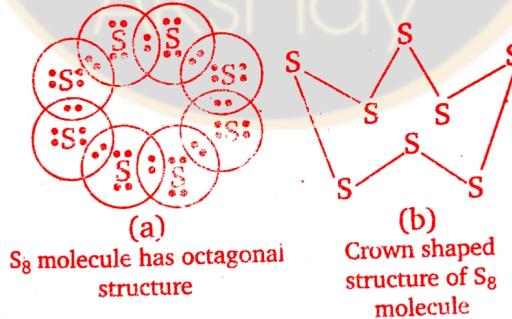
**Atomic number = 16**

**Electronic configuration = K L M**

**2 8 6**

**Number of valence electrons in each sulphur atom = 6**

**So it needs two more electrons to complete its octet. Hence, each sulphur atom shares two of its electrons one each with the other two sulphur atoms forming ring-like structure as shown below:**

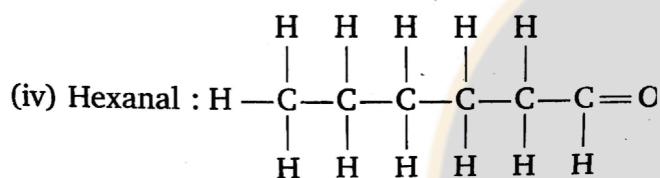
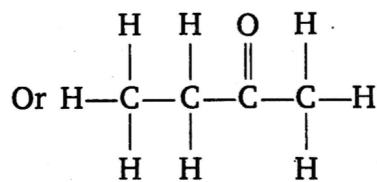
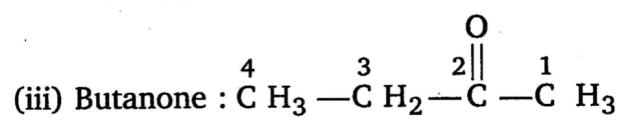
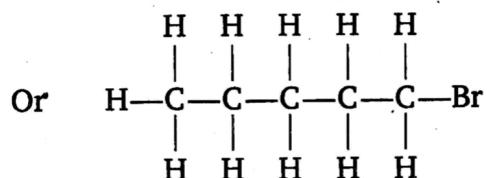
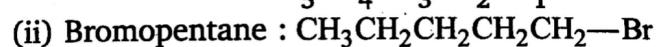
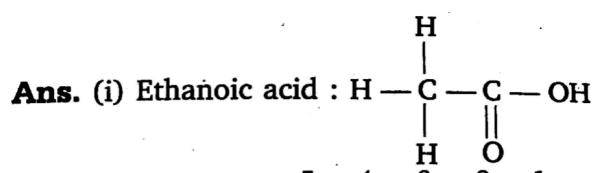


**Q.4. What are the two properties of carbon which lead to the huge number of carbon compound we see around us?**

**Ans. The two main properties which leads to huge number of carbon compounds are:**

**(i) Catenation** It is self linking property of carbon; due to its small size and high electronegativity. As a result of which, each carbon becomes capable of forming stable bonds with other carbon atoms. This can be extended in the form of straight chain or branched chains or in the form of rings.

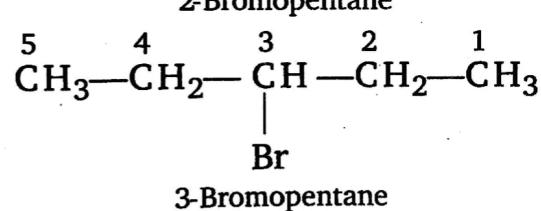
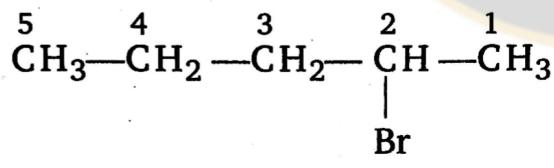
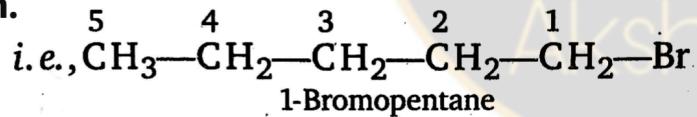
**(ii) Tetravalency** of Carbon Carbon having four electrons in its valence shell, can share these four electrons either with the other four carbon atoms or with any other elements like N, O, H, S and halogens, etc. Hence, the number of carbon compounds increases to large extent.

**Q.5. Draw the structures for the following compounds****(i) Ethanoic acid. (ii) Bromopentane. (iii) Butanone (iv) Hexanal.****Are structural isomers possible for bromopentane?****[CBSE 2013,17]**

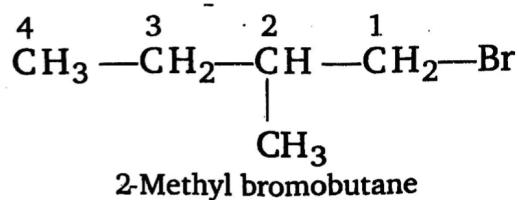
**Structural isomers are possible for bromopentane. These are of two main types:**

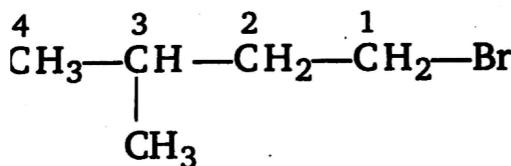
**(a) Position isomers (b) Chain isomers**

**(a) Position isomers** These arise due to the different positions of bromo group in the carbon chain.

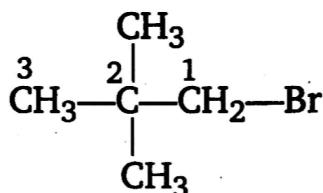


**(b) Chain isomers** These arise due to the different number of carbon atoms in carbon compound chain.

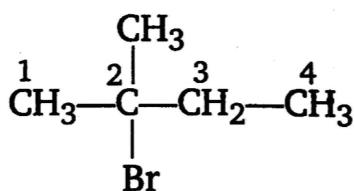




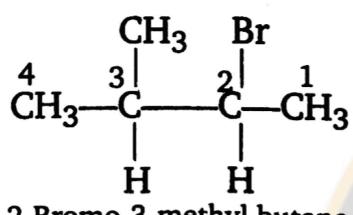
3-Methyl bromobutane



2, 2-Dimethyl bromopropane



2-Bromo-2-methyl butane



2-Bromo-3-methyl butane

**Q.6. What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound.**

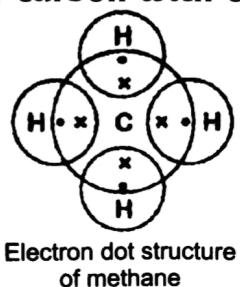
**Why are such compounds :**

(i) poor conductors of electricity? and

(ii) have low melting and boiling points? What happens when this compound burns in oxygen?

[CBSE 2019]

**Sol. Methane is a compound of carbon with chemical formula CH<sub>4</sub>.**



Electron dot structure  
of methane

**Covalent bonds are formed in this compound.**

(i) In covalently bonded molecules, the electrons are shared between atoms and no charged particles are formed. Therefore, such compounds are generally poor conductors of electricity.

(ii) Covalently bonded molecules are seen to have strong bonds within the molecule, but have weak inter-molecular forces. This gives rise to low melting and boiling points of these compounds.

**When methane burns in oxygen, CO<sub>2</sub>, H<sub>2</sub>O and a large amount of heat and light is released.**