

## Ch – 9 Carbon and its Compound

### A. Define the following.

1. Allotropy

Ans: **Allotropy:** The property of an element to exist in various physical forms that have identical chemical properties but different physical properties is called allotropy.

2. Fullerene

Ans: **Fullerene:** It is the crystalline form of carbon in which the carbon atoms are arranged in the form of hexagonal and pentagonal rings that are interlocked with each other.

3. Destructive distillation

Ans.: **Destructive distillation:** The process of breaking down of organic substances by heating them at high temperatures in the absence of air is called destructive distillation.

4. Adsorption

Ans.: **Adsorption:** The property of a substance due to which it can hold the molecules of solids, liquids or gases as a thin film or layer on its surface is called adsorption.

5. Asphyxia

Ans.: **Asphyxia:** It is a medical condition in which the body does not get enough oxygen, which leads to death or coma if untreated

### B. Differentiate between the following.

1. Organic compounds and inorganic compounds of carbon

2. Natural diamonds and synthetic diamonds

3. Coal and coke

4. Wood charcoal and animal charcoal

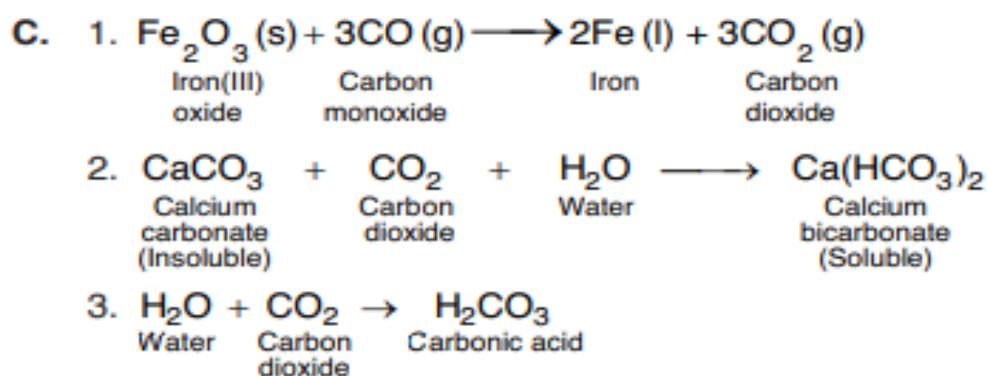
5. Charcoal and gas carbon

1.	<b>Organic Compounds</b> The chemical compounds that contain carbon and hydrogen atoms in them are referred to as organic compounds. Examples: Carbohydrates and hydrocarbons	<b>Inorganic Compounds</b> The chemical compounds that do not contain carbon atoms in them are referred to as inorganic compounds. Examples: Carbon dioxide and carbon monoxide
2.	<b>Natural Diamonds</b> These diamonds are produced from carbon about 150 km below the Earth's surface at high pressure and temperature. Example: Kohinoor diamond	<b>Synthetic Diamonds</b> These diamonds are prepared from carbon through artificial processes at extremely high temperature and pressure. These are widely used in optical windows, in polishing, grinding and cutting tools.

3.	<b>Coal</b>	<b>Coke</b>
	It is a black, hard, solid fossil fuel.	It is a hard, porous and grey-coloured substance obtained as a residue from the destructive distillation of coal.
	It is formed when organic matter gets deposited deep inside the earth and gets decomposed under high pressure and temperature and in the absence of air over a period of millions of years.	It contains about 95 per cent carbon and does not produce smoke on burning.
4.	<b>Wood Charcoal</b>	<b>Animal Charcoal</b>
	It is prepared by the destructive distillation of wood in the absence of air.	It is prepared by the destructive distillation of animal bones.
	It acts as a good adsorbent.	It has good decolourizing property.
5.	<b>Charcoal</b>	<b>Gas Carbon</b>
	It is a black, soft and porous solid.	Gas Carbon is produced by the destructive distillation of coal and also by heating hydrocarbons at high temperatures in a closed container.
	It is prepared by heating organic substances such as wood, bone and sugar at high temperatures in the absence of air or oxygen.	It is a good conductor of electricity and used in the manufacture of electrodes.

C. Write the balanced equation for the following reactions.

1. Reaction of carbon monoxide with iron oxide
2. Reaction of carbon dioxide with calcium carbonate
3. Reaction of carbon dioxide with water



**D. Answer the following questions in brief.**

2. Define allotropy. Give examples of elements that exhibit allotropy.

Ans: The property of an element to exist in various physical forms that have identical chemical properties but different physical properties is known as allotropy. Examples: Diamond, graphite and fullerene are the allotropes of crystalline form of carbon.

3. Mention the various uses of diamond.

**Ans: Uses of diamond:**

- a) Diamonds are widely used as precious gems in jewellery. Their powder is used to polish other diamonds and precious stones
- b) They are used in drilling of hard rocks and cutting of glass

6. What are the combined states of carbon?

**Ans:** The organic and inorganic compounds are the various combined states of carbon.

**E. Answer the following questions in detail.**

1. Explain any four amorphous forms of carbon.

- a) Coal, charcoal, lampblack, gas carbon and coke are the amorphous forms of carbon.
- b) Charcoal is prepared by heating organic substances such as wood, bone and sugar at high temperatures in the absence of oxygen.
- c) Lampblack is produced when carbon-rich substances such as oil or kerosene are burned in a limited supply of air or oxygen.
- d) Gas carbon is produced by the destructive distillation of coal. It is used in the manufacture of electrodes.
- e) Coke is a residue obtained by the destructive distillation of coal. It is used as a household and an industrial fuel.

3. Briefly explain the chemical properties of carbon.

**Ans: Chemical Properties of Carbon**

1. Carbon compounds generally show 4 reactions, they are

- a) Combustion reaction
- b) Oxidation reaction,
- c) Addition reactions
- d) Substitution reaction.

2. When carbon is burned in the air to give carbon dioxide, it is called as combustion.

For examples When methane  $\text{CH}_4$  is burnt in the presence of oxygen it gives us carbon dioxide, heat, light

**Application-based Question**

A. Ishita wanted to select one of the allotropic forms of carbon as a lubricant for fast moving machinery parts. Which material should she use and why?

**Ans:** Graphite, as it is slippery in nature, it is used as a lubricant.

B. Ram slept in a closed room in which coal was burned. Will Ram be affected with asphyxia?

**Ans;** Yes, Ram will be affected with asphyxia, as the availability of oxygen is less and the percentage of carbon monoxide is more.

C. Both diamond and graphite are made up of carbon. However, graphite can conduct electricity but diamond cannot. Similarly, diamond can cut but graphite cannot. Why?

**Ans:** Graphite conducts electricity because in graphite, each carbon atom is only bonded to three other carbon atoms.

Thus, carbon atoms in graphite have a free electron which conducts electricity. Diamond can cut glass because of its rigid three-dimensional structure which makes diamond very hard while graphite is soft and slippery due to its sheet structure.