

Chapter – 6 Combustion and Flame

- **Combustion:** The process of burning a substance in the presence of air (oxygen) and undergoes a chemical reaction to produce heat and light.
- The substances which burn in air are called **combustible**.
- Oxygen (in air) is **essential** for combustion.
- During the process of combustion, heat and light are given out.
- **Ignition temperature** is the lowest temperature at which a combustible substance catches fire.
- **Types of combustion:** The type of combustion differs depending on the type of fuel. Based on nature and intensity combustions are classified into three types. They are:
 - (i) Rapid combustion
 - (ii) Spontaneous combustion
 - (iii) Explosion
- **Flame:** It is a zone or burning vapour. The substances which vaporise during burning give flames. Example: Kerosene oil and molten wax.
- Inflammable substances have very low ignition temperature.
- Fire can be controlled by removing one or more requirements essential for producing fire.
- Water is commonly used to control fires.
- Water cannot be used to control fires involving electrical equipments or oils.
- There are three different zones of a flame - dark zone, luminous zone and non-luminous zone.
- Fuel is any material that is burned to obtain energy that can be used to heat or move another object.
- A good fuel must:
 - Be readily available.
 - Be cheap.
 - Burn easily at a moderate rate.

- Produce a large amount of heat.
 - Not leave behind any undesirable substances.
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- Fuels differ in their efficiency and cost.
 - Fuel efficiency is expressed in terms of its calorific value which is expressed in units of kilo joule per kg.
 - **Types of Fuels:**
 - (i) **Solid Fuels:** Combustible substances which are solid at room temperature.
Example: coal, coke, wood, charcoal, etc.
 - (ii) **Liquid fuels:** Volatile liquids which produce combustible vapour. Example: Petrol, kerosene, alcohol, diesel, etc.
 - (iii) **Gaseous fuels:** Combustible gases or mixture of combustible gases. Example: Natural gas, LPG, biogas, coal gas, etc.
 - **Effects of Burning of Fuels:**
 - (i) Carbon fuels like wood, coal petroleum release un burnt carbon particles. These are dangerous pollutants causing respiratory diseases, such as asthma.
 - (ii) Incomplete combustion of carbon fuels gives carbon monoxide which is a poisonous gas.
 - (iii) Increased concentration of carbon dioxide in the air is believed to cause global warming.
 - (iv) Oxides of Sulphur and nitrogen dissolve in rain water and form acids. Such rain is called acid rain. It is very harmful for crops, buildings and soil.
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- Un burnt carbon particles in air are dangerous pollutants causing respiratory problems.
 - Incomplete combustion of a fuel gives poisonous carbon monoxide gas.
 - Increased percentage of carbon dioxide in air has been linked to global warming.
 - Oxides of sulphur and nitrogen produced by the burning of coal, diesel and petrol cause
 - Acid rain which is harmful for crops, buildings and soil.