

COMBUSTION & FUEL

1. What is Combustion?

Ans: The burning of a substance in the presence of oxygen to release heat and light in the form of energy.

combustible
substances

non
combustible
substances

Combustible substances catch fire easily

Example: paper, wood, CNG, LPG

Non-combustible substances do not catch fire easily.

Example: water, glass, metal.

2. what is ignition temperature?

Ans. A certain minimum temperature at which a substance catches fire

Conditions necessary for combustion

- Presence of supporter of combustion
- Presence of combustible substance
- The substance must be heated to its ignition temperature

Types of Combustions

The type of combustion depends upon the type of fuel used

- 1. complete and incomplete combustion**
- 2. rapid and spontaneous combustion**
- 3. explosion**

1. complete combustion: takes place when sufficient amount of oxygen is available

Fuel burns completely
Carbon dioxide and water are formed
Carbon dioxide is released as product

Incomplete combustion: takes place when limited amount of oxygen is available

The substances that do not burn pass into atmosphere as soot
Carbon monoxide is released

2. rapid combustion: Occurs when substance burns rapidly

External ignition is required
Produces heat & light

Spontaneous combustion: occurs when substance unexpectedly bursts in flame without apparent cause

Occurs on its own no external ignition is required

3. Explosion: takes place suddenly with evolution of heat and light

FLAME

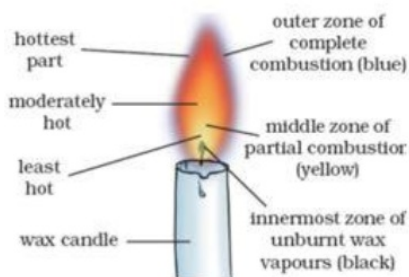
3. What is flame?

Ans. A zone of burning gases or vapors mixed with air.

Candle flame

Zones of candle flame

- **Outermost zone**
- **Middle zone**
- **Innermost zone**



1. outermost zone: non luminous zone, zone of complete combustion

Has direct contact with air

Receives surplus amount of oxygen

2. middle zone: luminous zone, zone of incomplete combustion

does not receive adequate amount of oxygen

forms black soot

3. innermost zone: dark zone, zone of no combustion

No oxygen

FUELS

5. what are fuels?

**Ans. The combustible substances that are used for generating heat and light
Most of the fuels are hydrocarbon**

6. what are hydrocarbons?

Ans. Compounds of hydrogen and carbon.

When hydrocarbons burn, CO_2 and H_2O are formed and heat and light is released

Examples of fuels: LPG, CNG, kerosene, wood, petrol, diesel

7. What are fossil fuels?

Ans. The naturally formed fuels from dead remains of plants and animals.

Millions of years ago, when plants died they got buried in earth leading to coal

Plants and animal that died inside sea form petroleum and natural gas.

Classification of fuels.

1. on the basis of renewability-

Renewable fuels- can be used for long time

Non renewable fuels- can get exhausted soon.

2. on the basis of physical state-

Solid fuels- bulky, keep behind ash or residue

Liquid fuel- do not leave behind residue

Gaseous fuels- exist in gaseous state

3. on the basis of source-

Primary fuels- occurs in same form as in nature

Obtained by various processes

FUEL EFFICIENCY

8. what is calorific value?

Ans. The amount of heat produced on burning of 1kg of fuels

Characteristics of ideal fuel

- **Should have reasonably high calorific value & moderate rate of combustion**
- **Easily transportable**
- **Cheap and readily available**
- **Cause minimum air pollution**
- **Should not produce any harmful products on burning**
- **Ignition temperature must be above room temperature**

9. which gases are released after burning of fuels?

Ans. Sulphur dioxide, carbon dioxide, carbon monoxide, oxides of nitrogen.

Effects of burning of fuels

- **Global warming**
- **Acid rain**
- **Carbon monoxide**
- **Lead compounds.**