

Study Notes: CBSE Class 8th Physics (Combustion And Flame)

Contents:

- **Combustible substances**
 - **Types of combustion**
 - **Flame**
 - **Fuels and fuel efficiency**
- A chemical process in which a substance reacts with oxygen to give heat is called **combustion**. The substance that undergoes combustion is called to be a combustible. It is also called **fuel**. E.g. petrol, kerosene. The fuel may be solid, liquid or gas. For combustion air is necessary.

Note: In the sun, heat and light are produced by nuclear reactions.

- The lowest temperature at which a substance catches fire is called **ignition temperature**. A combustible substance cannot catch fire or burn as long as its temperature is lower than its ignition temperature. The substances which have very low ignition temperature and can easily catch fire with a flame are **inflammable substances**. E.g. petrol, alcohol, LPG (Liquefied petroleum gas) etc.

Note: The head of the safety match is made from antimony trisulphide and potassium chlorate. The rubbing surface has powdered glass and a little red phosphorous. When the matches is struck against the rubbing surface, some red phosphorous get converted into white phosphorous which reacts with the potassium chlorate in the match ignite antimony trisulphide and start the combustion.

- When there is a fire, break out, the fire brigade pours water on the fire. Water cools the combustion material so that its temperature is brought below its ignition temperature thus, preventing the fire from spreading.
- The job of the fire extinguisher is to cut off the supply of the air, or to bring down the temperature of the fuel or both. The most common fire extinguisher is water but it is not suitable for involving oil and petrol. For fires involving electrical equipment and inflammable materials, carbon dioxide (CO₂) is the best extinguisher, which is stored at the high pressure as a liquid in cylinders. Also, near the fire CO₂ can be given off by using chemical like sodium bicarbonate, potassium bicarbonate etc.

Types of combustion:

- Combustion in which gas burns rapidly and produces light and heat is known as **rapid**

combustion. E.g. burning of gas stove in kitchen. The type of combustion in which a material is suddenly bursts in the flames without application of any apparent is called **spontaneous combustion.** E.g. spontaneous combustion of coal dust. Combustion in which a sudden reaction takes place with the evolution of heat, light and sound is known as **explosion** e.g. ignition of fire crackers.

- The substances which vaporise during burning give flames. For e.g. kerosene oil rise through the wick, vaporise during burning form flames. The different zones of the candle flame are outer zone, middle zone and innermost zone.

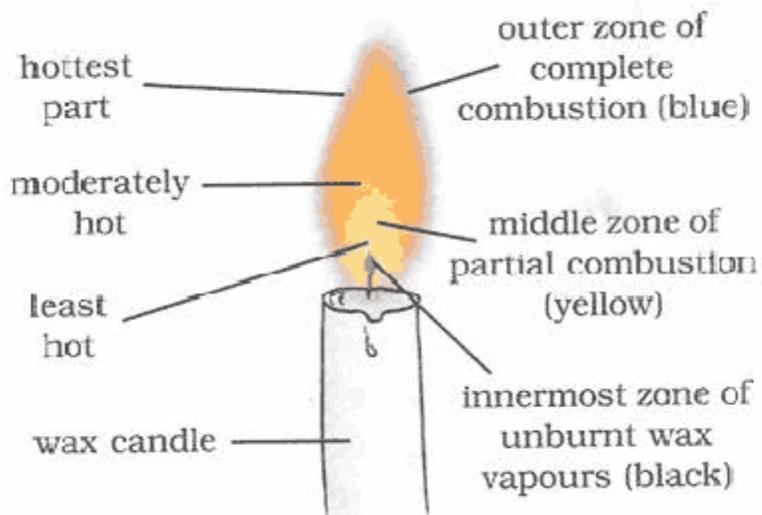


Fig. 1 Different zones of candle flame

Goldsmiths blow the outer zone of the flame with a metallic blow pipe for melting gold and silver.
Fuel

- A good fuel is one which is cheap, readily available, burns easily in air at a moderate rate. It produces a large amount of heat. It does not leave behind any undesirable substances.
- The amount of the heat produced on complete combustion of 1 kg of the fuel is called its **calorific value**. It is expressed in **kilo joule per kg**. A good fuel has a high calorific value.
- The increasing fuel combustion has harmful effects on the environment like carbon fuel (wood, coal, petroleum) release unburn carbon particles which causes respiratory diseases. Incomplete combustion of these fuels gives carbon monoxide gas which is poisonous gas combustion of most fuels releases carbon dioxide. Increased concentration of carbon dioxide in the air causes global warming.
- Burning of coal and diesel releases sulphur dioxide. Moreover, petrol engines give oxides of nitrogen. Oxides of nitrogen and sulphur dissolve in water of rain to form acids. Such rain is called acid rain which is very harmful for crops, building and soil.

Points to remember:

- Substances which burn in air are combustible.
- During combustion heat and light is given out.
- The lowest temperature at which a combustible substance catches fire is called ignition temperature.
- There are various types of combustion as rapid combustion, spontaneous combustion, explosion etc.
- Fuel efficiency is expressed in terms of calorific values.