EDUCATION SOURCE
A Source of Your Way to Success

COMBUSTION AND FLAME

Chapter: - 6

SCIENCE

CLASS8TH

Education source.

Chapter: 6
Combustion and Flame

Exercise:

Q1: List conditions under which combustion can take place.

Ans: - List conditions under which combustion can take place are: -

(a) Presence of a Fuel
(b) Presence of Air
(c) Ignition temperature.

Q2: Fill in the blanks.

(a) Burning of wood and coal causes Pollution **of air.**
(b) A liquid fuel, used in homes is LPG.
(c) Fuel must be heated to its Ignition temperature **before it starts burning.**
(d) Fire produced by oil cannot be controlled by water**.**

Q3: Explain how the use of CNG in automobiles has reduced pollution in our cities.

Ans: The use of Compressed Natural Gas (CNG) in automobiles has reduced pollution in our cities because CNG combustion produces fewer harmful emissions compared to gasoline or diesel, leading to reduced air pollution and lower levels of pollutants such as carbon monoxide, nitrogen oxides, and particulate matter.

Q4: Compare LPG and wood as fuels.

Ans: - LPG (Liquefied Petroleum Gas) and wood are both used as fuels, but they have several differences. Here is a comparison between LPG and wood as fuels:

(a)Energy Content: LPG has a higher energy content compared to wood. It releases more heat when burned, making it a more efficient fuel for various applications.

(b) Cleanliness: LPG burns cleaner than wood.

(c) **Environmental Impact:** LPG has a lower environmental impact compared to wood.

Q5: Give reasons.

(a) Water is not used to control fires involving electrical equipment.

(b) LPG is a better domestic fuel than wood.

(c) Paper by itself catches fire easily whereas a piece of paper wrapped around an aluminium pipe does not.

Ans: -

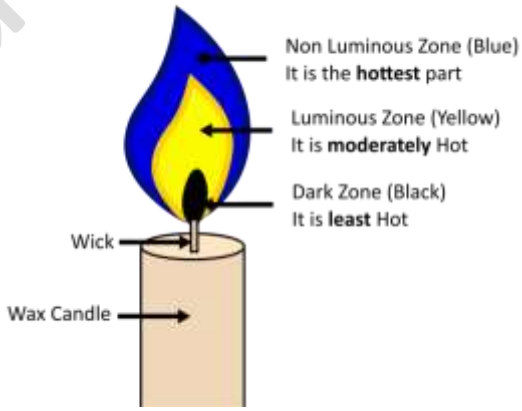
(a) Water is not used to control fires involving electrical equipment because water is a conductor of electricity and can cause electric shock or further damage to the equipment when applied.

(b) LPG is a better domestic fuel than wood as it burns cleaner, produces less smoke and ash, offers better control over combustion, and is readily available in convenient forms like cylinders or piped systems.

(c) Paper by itself catches fire easily due to its flammable nature, whereas wrapping a piece of paper around an aluminium pipe act as a barrier, preventing direct contact with flame or heat, thereby reducing the chances of ignition.

Q6: Make a labelled diagram of a candle flame.

Ans:

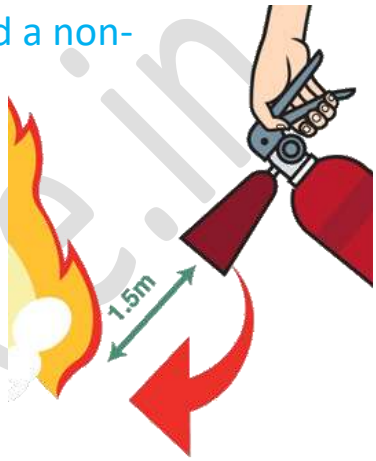


Q7: Name the unit in which the calorific value of a fuel is expressed.

Ans: Kilojoule per kg (Kj/kg).

Q8: Explain how CO_2 is able to control fires.

Ans: - Carbon dioxide (CO_2) is a non-combustible gas and a non-supporter of combustion. It extinguishes fire through two mechanisms:



1. By acting as a blanket, it covers the fire, cutting off the contact between oxygen and fuel.
2. When released from cylinders, CO_2 expands rapidly, cooling down the surroundings and lowering the temperature of the fuel, aiding in fire control.

Q9: It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain.

Ans: It is difficult to burn a heap of green leaves but dry leaves catch fire easily because the ignition temperature of dry leaves is less than the green leaves so that dry leaves can catches fire easily.

Q10: Which zone of a flame does a goldsmith use for melting gold and silver and why?

Ans: Outer zone of the flame does a goldsmith use for melting of gold and silver due to its high temperature.

Q11: In an experiment 4.5 kg of a fuel was completely burnt. The heat produced was measured to be 180,000 kJ. Calculate the calorific value of the fuel.

Ans: - Given

Mass of fuel = 4.5 kg

Heat produced = 180,000 kJ

Calorific value of a fuel = $\frac{\boldsymbol{total\ heat\ produced}}{\boldsymbol{total\ mass\ burnt}} = \frac{180{,}000}{4.5} = 40{,}000\ kj/kg$

Therefore, calorific value of fuel = 40,000 kj/kg

Q12: Can the process of rusting be called combustion? Discuss.

Ans: - Yes, process of rusting can be called combustion, because this is also occurred in the presence of oxygen and humid air. It is a slow process and called slow burning.

Q13: Abida and Ramesh were doing an experiment in which water was to be heated in a beaker. Abida kept the beaker near the wick in the yellow part of the candle flame. Ramesh kept the beaker in the outermost part of the flame. Whose water will get heated in a shorter time?

Ans: - Ramesh's water heated faster because he used the outer layer which usually more heat as compared to the other layer of flame.

Key Worlds

(i) ACID RAIN: Precipitation (rain, snow, or fog) that contains high levels of acidic compounds, primarily sulphur dioxide and nitrogen oxides, resulting from the combustion of fossil fuels.

(ii) CALORIFIC VALUE: The amount of heat energy released per unit mass or volume of a fuel when it undergoes complete combustion. It indicates the fuel's energy content and is typically measured in joules or calories.

(iii) COMBUSTION: A chemical process in which a fuel reacts rapidly with oxygen, release heat and light. It is a form of oxidation that results in the production of combustion by-products, such as carbon dioxide, water vapor, and various pollutants.

(iv) DEFORESTATION: The clearing or removal of trees and vegetation from a forested area, primarily due to human activities such as logging, agriculture, or urbanization.

(v) EXPLOSION: A sudden and violent release of energy, often accompanied by the rapid expansion of gases or the release of large amounts of heat and light. Explosions can occur due to the combustion of flammable substances, chemical reactions, or the build-up of pressure.

(vi) FLAME: The visible, glowing, and often flickering portion of a fire that occurs when gases emitted during combustion. Flames vary in colour and shape depending on the fuel and conditions.

(vii) FIRE EXTINGUISHER: A device designed to control or extinguish small fires. Fire extinguishers work by releasing substances that can remove oxygen, cool the fire, or interrupt the chemical reaction necessary for combustion.

(viii) FUEL: A substance that is burned or consumed to produce heat or energy. Fuels can be solid (e.g., wood, coal), liquid (e.g., gasoline, diesel), or gaseous (e.g., natural gas, propane).

(ix) FUEL EFFICIENCY: A measure of how effectively a fuel is utilized to produce useful energy. It refers to the amount of energy output obtained from a fuel relative to the amount of energy input. Higher fuel efficiency means less wasted energy.

(x) GLOBAL WARMING: The long-term increase in Earth's average temperature primarily due to the build-up of greenhouse gases, such as carbon dioxide, in the atmosphere.

(xi) IDEAL FUEL: A type fuel that possesses characteristics such as high energy content, easy availability, low cost, clean combustion with minimal pollutants, and safety during handling and storage.

(xii) IGNITION TEMPERATURE: The minimum temperature at which a fuel can spontaneously ignite and sustain combustion without an external ignition source**.**

(xiii) INFLAMMABLE SUBSTANCES: Substances that can easily catch fire and undergo combustion.