

Subject:- Science
Class- VIII
Chapter-6
Combustion and Flame

Exercises:

1. List conditions under which combustion can take place.

Solution: Combustion can be defined as a process of reaction of a substance with oxygen. There are certain conditions required for combustion to take place.

They are: (i) Presence of a fuel (ii) Air (or oxygen) (iii) Ignition temperature (minimum temperature at which a substance catches fire).

2. Fill in the blanks:

(a) Burning of wood and coal causes _____ of air.

(b) A liquid fuel used in homes is _____.

(c) Fuel must be heated to its _____ before it starts burning.

(d) Fire produced by oil cannot be controlled by _____.

Solution: (a) pollution, (b) kerosene, (c) ignition temperature, (d) water.

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

Solution: The amount of unburnt carbon particles produced by CNG is much less in comparison to petrol and the amount of harmful gases produced is also less. Hence CNG is comparatively a cleaner fuel than petrol. Using CNG in automobiles has therefore helped in reducing pollution in cities.

4. Compare LPG and wood as fuels.

Solution:

Sl. No.	LPG	Wood
1.	A clean fuel. Leaves no	Releases high amount of harmful gases

	residue and produces very less amount of harmful gases.	which can cause respiratory diseases. Also it is obtained from trees thus leading to deforestation
2.	Calorific value of LPG is 55,000 kJ/kg	Calorific value of wood is between 17,000 - 20,000 kJ/kg.

5. 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 aluminum pipe does not.

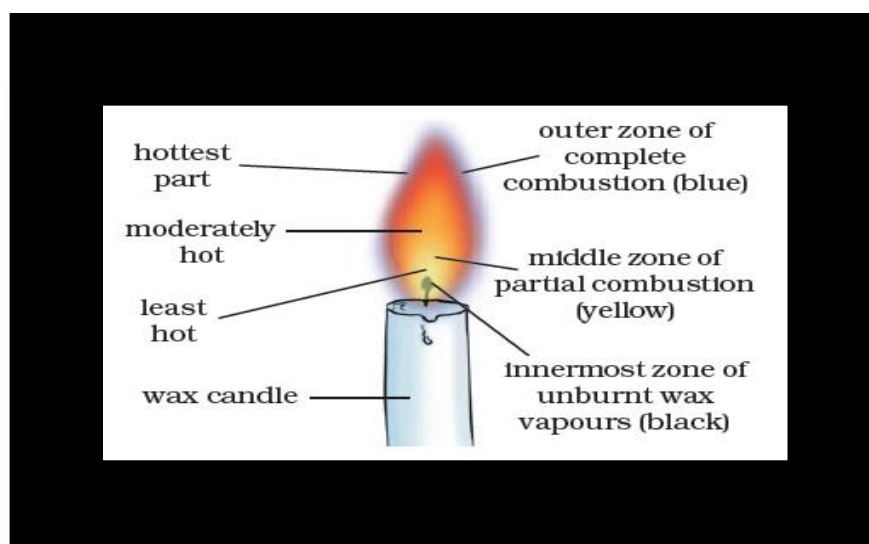
Solution: (a) Water is a good conductor of electricity. If it is used for controlling a fire involving electrical equipment, then the person dousing the fire might get an electric shock. Also, water can damage the electrical equipment.

(b) LPG is a better domestic fuel because being a gaseous fuel it does not produce smoke and there are negligible unburnt carbon particles, which can cause respiratory problems.

(c) A piece of paper wrapped around aluminium pipe does not catch fire easily. This is because aluminium, being a metal, is a good conductor of heat. Therefore, heat is transferred from the paper to the metal and eventually paper does not attain its ignition temperature.

6. Make a labeled diagram of a candle flame.

Solution:



- The least hot part in a flame is in its innermost zone.
- The moderate hot part in a flame is in its middle zone.
- The highest or the hottest part in a flame is in its outer zone.

7. The unit of calorific value of a fuel is expressed in _____.

Solution: The calorific value of a fuel is expressed in kilojoules per kilogram (kJ/kg).

8. Explain how CO₂ is able to control fires.

Solution: CO₂ is a non-combustible gas and it is also a non-supporter of combustion. It extinguishes fire in two ways: (i) Since it is heavier than oxygen, it covers the fire like a blanket and cuts off the contact between oxygen and fuel. (ii) In cylinders, CO₂ is kept in the liquid form under pressure. When released, it expands enormously and cools down. This brings down the temperature of the fuel, which helps in controlling the fire.

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

Solution: Green leaves have a lot of moisture in them. This moisture does not allow them to catch fire easily. However, dry leaves have no moisture in them. Therefore, they catch fire easily.

10. Which zone of a flame does a goldsmith use for melting gold and silver and why?

Solution: Goldsmiths use the outermost part/zone of the flame to melt gold and silver. This is because the outermost zone of the flame undergoes complete combustion and is the hottest part of the flame.

11. 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.

Solution: The calorific value of fuel is the amount of heat produced by the complete combustion of 1 kg of fuel, Now, Heat produced by 4.5 kg of fuel = 180000 kJ

Therefore, heat produced by 1 kg of fuel

$$180000 / 4.5 \times 1 \text{ kJ/kg} = 40,000 \text{ KJ / kg}$$

Hence, the calorific value of the fuel is 40,000 KJ/kg.

12. Can the process of rusting be called combustion? Discuss.

Solution: Yes, rusting is a kind of slow combustion process because here iron combines with oxygen generating heat.

13. 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?

Solution: The water in the Ramesh's beaker will heat up in a shorter time. This is because the outermost zone of a flame is the hottest zone, while the yellow zone (in which Abida had kept the beaker) is less hot.

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