

Textbook Questions

1. List conditions under which combustion can take place.

Ans. Combustion takes place under following conditions :

(i) Some fuel is required for combustion. During combustion a fuel substance reacts with oxygen to give off heat.

(ii) Oxygen, present in air is essential for combustion. Combustion cannot take place in the absence of oxygen.

(iii) For combustion, an inflammable substance must be heated to its ignition temperature.

2. Fill in the blanks :

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

(b) A liquid fuel, used in home is

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

(d) Fire produced by oil cannot be controlled by

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

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

Ans. Compressed Natural Gas (CNG) is now most usable fuel in automobiles; because it produce the harmful products in very small amount. It is a cleaner fuel.

4. Compare LPG and wood as fuels.

Ans. Comparison between LPG and wood as fuels :

S. No.	LPG	Wood
1.	It is a gaseous fuel.	It is a solid fuel.
2.	It is easily stored in cylinder.	It needs more space to store.
3.	It is smoke free fuel.	It produce lot of smoke which is cause of pollution.
4.	Its calorific value is 55000 kJ/g.	Its calorific value is 17000-22000 kJ/s.
5.	It does not cause of environment problem.	We get wood after deforestation which is harmful for environment.

5. Give reasons :

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

Ans. As extinguisher water works only when things like wood and paper are on fire. If electrical equipments on fire water may conduct electricity and harm those trying to stop the fire.

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

Ans. LPG has more calorific value, produces no pollution and easy to store and use. So it is a better domestic fuel than wood.

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

Ans. The paper by itself catches fire easily because its ignition temperature is low, while a piece of paper wrapped around aluminium pipe does not catch fire, because its ignition temperature rises.

6. Make a labelled diagram of a candle flame.

Ans.

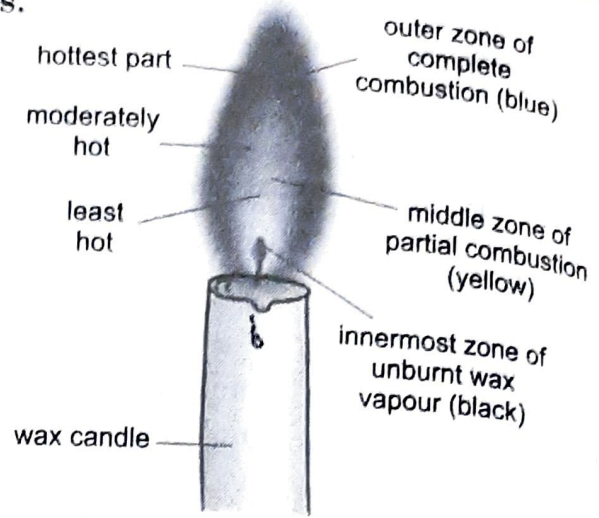


fig. Different zones of Candle flame

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

Ans. Kilo Joule per kg (kJ/kg).

8. Explain how CO₂ is able to control fire.

Ans. CO₂ is heavier than oxygen, it covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled.

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

Ans. Green leaves consist water and moisture in them hence, it makes it difficult to catch fire. Whereas dry leaves has lost all the water and moisture contained in it and hence, it catches fire easily.

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

Ans. The outer zone of flame or non-luminous zone of a candle is the hottest zone and has more temperature. So goldsmith use this zone for melting gold and silver.

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.

Ans. Heat produced = 180,000 kJ

amount of heat = 4.5 kg

$$\text{Calorific value} = \frac{\text{heat produced}}{\text{amount of fuel}}$$

$$\text{So, Calorific value} = \frac{180,000 \text{ kJ}}{4.5 \text{ kg}}$$

$$= 40,000 \text{ kJ/kg}$$

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

Ans. Rusting and combustion, both are chemical processes in which requirement of oxygen is necessary. But in rusting substance reacts with oxygen and gives its oxide and in combustion substance reacts with oxygen and give off heat. So both are different.

13. Abida and Ramesh were doing an experiment in which water was to be heated in 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. Where water will get heated in a shorter time?

Ans. The water heated by Ramesh will take less time. Because he kept the beaker near the hottest zone of the flame.

Activity 6.1

1. Collect some material like straw, match sticks, kerosene oil, paper, iron nails, stone pieces, glass etc.

2. Try to burn each of these materials one by one. If combustion takes place mark the material combustion otherwise mark it non-combustion.

Observation Table :

Material	Combustible	Non-combustible
Wood	✓	×
Paper	✓	×
Iron nails	×	✓
Kerosene oil	✓	×
Stone piece	×	✓
Straw	✓	×
Charcoal	✓	×
Match sticks	✓	×
Glass	×	✓

Result : Wood, Paper, Kerosene oil, Straw, Charcoal and Matchsticks are combustible and Iron nails, Stone pieces, Glass are non-combustible.

Activity 6.2

1. Fix a lighted candle on a table.
2. Put a glass chimney over the candle and rest it on a few wonder blocks in such a way that air can enter the chimney.
3. Observe what happens to the flame.
4. Now remove the block and let the chimney rest on the table.

5. Again observe the flame.

6. Finally, put a glass plate over the chimney and watch the flame again.

Observation :

(i) In case (a) the candle burns freely due to the presence of air.

(ii) In case (b) the flame flickers and produces smoke because there is no sufficient air.

(iii) In case (c) the flame finally goes off because air is not available.

Conclusion : This shows that the air is necessary for burning.

Activity 6.3

1. Place a piece of burning wood or charcoal on an iron plate or Tawa.

2. Cover it with a glass jar or a tumbler or a transparent plastic jar.

3. Observe what happens.

Observation and Result : The wood or charcoal under the jar continues burning for sometimes because some air is present there. And it stop burning after sometime because of using the air inside the jar. It shows that air is necessary for combustion.

Activity 6.4

1. Make two paper cups by folding a sheet of paper.

2. Pour about 50 mL of water in one of the cups.

3. Heat both the cups separately with a candle.

4. What do you observe?

Observation and Result :

1. The empty cup catches fire and starts burning because candle flame raises temperature of the empty cup above ignition temperature.

2. The cup having water in it does not catch fire and the water became hot because the heat transferred in water by conduction. So temperature of the cup does not reach its ignition temperature. Hence, it does not burn.

Activity 6.5

1. Light a candle.

2. Hold a glass tube with a pair of tongs and introduce its one end in the dark zone of a non-flickering candle flame.

3. Bring a lighted matchstick near the other end of the glass tube.

4. Do you see a flame ? If so, what is it that produces a flame ?

5. Notice that the wax near the heated wick melts quickly.

Observation and Result : We see flame at the end of glass tube because the substance which vapourise during burning, gives flame.

Inter Text Questions (Paheli Boojho)

1. We were told that food is a fuel for our body.

Ans. We get energy from food intake. In our body food is broken into small units by reaction with oxygen and produces heat.

2. We have read that the sun produces its own heat and light. It is also some kind of combustion ?

Ans. In the sun, heat and light are produced by nuclear reactions. That is not combustion.

3. We are advised never to sleep in a room with burning or smouldering coal fire in it, why ?

Ans. It is dangerous to sleep in a room in which burning or smouldering coal fire in it because it gives carbon monoxide which is poisonous gas.