NCERT SOLUTIONS
CLASS VIII SCIENCE
CHAPTER-6 COMBUSTION AND FLAME

1. What are the conditions under which a combustion can take place?

Solution:

The burning of a substance in the presence of oxygen is defined as combustion.

The conditions under which combustion can take place are

The presence of fuel plays a significant role.
The presence of air or oxygen.
Ignition temperature is maintained (It is defined as the substance that catches fire at its lowest temperature.)

2. Fill the blank with the appropriate answer.

1. The burning of wood and coal causes a serious problem leading to _____
2. The liquid fuel used for cooking in homes is called as _____
3. Before the substance starts burning, the fuel must be heated to its_____
4. The fire which is produced by oil cannot be controlled by ____

Solution:

1. Pollution
2. LPG(Liquefied petroleum gas)
3. Ignition temperature
4. Water

3. Explain how CNG played an important role in reducing pollution among automobiles?

Solution:

Compressed natural gas (**CNG**).

The CNG can be an alternative for diesel, petrol and propane/LPG.
It usually contains few undesirable gases than the other fuels mentioned above.
The combustion of fuels like petroleum causes many un-burnt carbon particles along with carbon monoxide and leads to respiratory diseases.
CNG is comparatively a cleaner fuel.

4.Discuss about wood and LPG as fuels?

Solution:

Wood

It is considered as a traditional fuel used for both domestic and industrial purposes.
Wood produces a lot of smoke which pollutes the atmosphere as well as cause respiratory diseases.
The usage of wood to a large extent causes deforestation.
The calorific value of wood ranges between 17000 to 22000 kJ/kg
However, wood may be used as a furnace, stove or fireplace in indoors while it is used for a campfire, furnace at outdoors.

LPG

The usage LPG (Liquefied petroleum gas) has replaced wood.
It doesn't release smoke and other pollutants
It is a cleaner fuel
The fuel efficiency of LPG is more than that of wood.
The calorific value of LPG is 55000 kJ/kg

Hence LPG is mostly preferred choice

5. State the reasons for the following

a) Why isn't water used to control fire involving electrical circuits/ equipment?

Solution:

Water is a good conductor of electricity.
If added to an electrical fire, the water would just spread the electricity further.
The person dousing the fire might get an electric shock

b) Why is LPG regarded as a better domestic fuel than wood?

Solution:

LPG being a cleaner fuel than wood doesn't release smoke and other pollutants.
Wood on the other hand releases lot of smoke and fumes polluting the atmosphere causing pollution and leading to respiratory diseases.
Hence LPG is a better domestic fuel than wood.

c) Why does a paper by itself catches fire easily, but a piece of paper wrapped around an aluminum pipe does not?

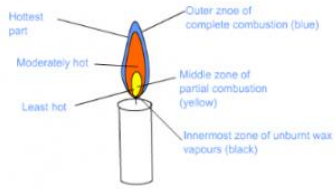
Solution:

The paper by itself catches fire easily because of its low ignition temperature
The piece of paper wrapped around an aluminum pipe doesn't catch fire because aluminum is a good conductor of electricity.
While the paper wrapped around an aluminum pipe results in an increase in ignition temperature. So there is a transfer of heat from paper to the aluminum pipe. Hence it doesn't catch fire.

6. Draw a labeled diagram of a candle.

Solution:

A candle is defined as an ignitable wick embedded in wax.



7. How do we express the unit of calorific value of a fuel?

Solution:

Calorific value is defined as the energy contained in the fuel. It is expressed in the form kJ/kg

kJ-kilo joules

kg- kilogram

8. Why is it difficult to burn a heap of green leaves, whereas dry leaves catch fire easily?

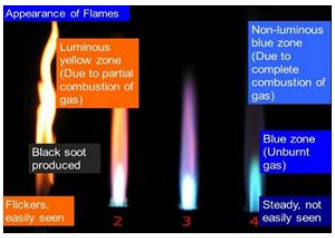
Solution:

A heap of green leaves contains a lot of moisture in it, hence its ignition temperature is high. Therefore it is difficult to catch fire.
But dry leaves have no moisture content in it, hence its ignition temperature is low. Therefore it catches fire easily.

9. Which part of flame does goldsmith use for melting gold and silver components?

Solution:

The goldsmith mainly uses non-luminous flame which is termed to be the outermost part of the flame. This part of the flame is used because the outermost flame undergoes complete combustion and is considered as the hottest part of the flame.



10. In an experiment performed by a student, he noted 6 kg of fuel was completely burnt. The heat was produced and is measured to be 240,000 kJ. Calculate the calorific value of the fuel?

Solution:

Calorific value is defined as the energy contained in the fuel

Now let us consider the complete combustion for 1kg of fuel.

Therefore

The heat produced by a 6kg of fuel = **240,000kJ**

$\Rightarrow \frac{heat\ produced\ in\ kg}{Total\ mass\ burnt}$

The overall heat produced by 1kg of fuel= $\frac{240000}{6} * 1$

$\Rightarrow 40,000kJ/kg$

Hence the calorific value of the fuel obtained from the experiment **=40,000kJ/kg**

11. Can the rusting process be called as combustion process? Comment on the statement?

Solution:

No, because rusting is an exothermic process as heat is liberated during rusting. On the other hand combustion is a chemical process in which a substance reacts with oxygen to release energy in the form heat or light.

So we can call rusting as a slow combustion process.

12. Eureka and Nikhil were performing an experiment in which water has to be heated in a beaker. Eureka placed the beaker near the yellow part of the candle flame whereas Nikhil placed it in the outermost part. What will be the result?

Solution:

The water placed in the outermost part of the flame will be heated in short time since it is non-luminous flame and is regarded as the hottest part of the flame. So Nikhil's beaker will be heated first. However, eureka who placed the beaker in the luminous flame (yellow flame)is comparatively less hot.