

## Chapter - 06

## Combustion and Flame

Que - (1) List conditions under which combustion can take place.

Combustion is a process of reaction of a certain substance with oxygen. There are certain conditions required for combustion to take place.

- (1) presence of fuel
- (2) Air (oxygen)
- (3) Ignition temperature

Que - (2) Fill in the blanks :-

- (a) Burning of wood and coal causes pollution of air.
- (b) A liquid fuel, used in home is kerosene.
- (c) Fuel must be heated to its ignition temperature before it starts.

Que - (3) Explain how the use of CNG in automobiles has reduced pollution in our cities.

As in CNG the amount of unburnt carbon particles produced is very less in comparison to petrol also the amount of harmful gases produced is very less, so CNG is comparatively a cleaner fuel than petrol.

Que- (4) Compare Lpg and wood as fuels.

Lpg	Wood
(i) A clean fuel leaves least <del>seed</del> residue and produces less amount of harmful gases.	(i) It releases high amount of harmful gases which can cause respiratory problem.
(ii) It is a combination of different types of gases.	(ii) It is obtained from trees. Thus leading to deforestation.
(iii) Calorific value of Lpg is 55000 kJ/kg.	(iii) Calorific value of wood is 17000 - 22000 kJ/kg.

Que- (5) Give reasons.

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

As water is good conductor of electricity so if we try to control fire through water it may harm us by giving electrical shocks.

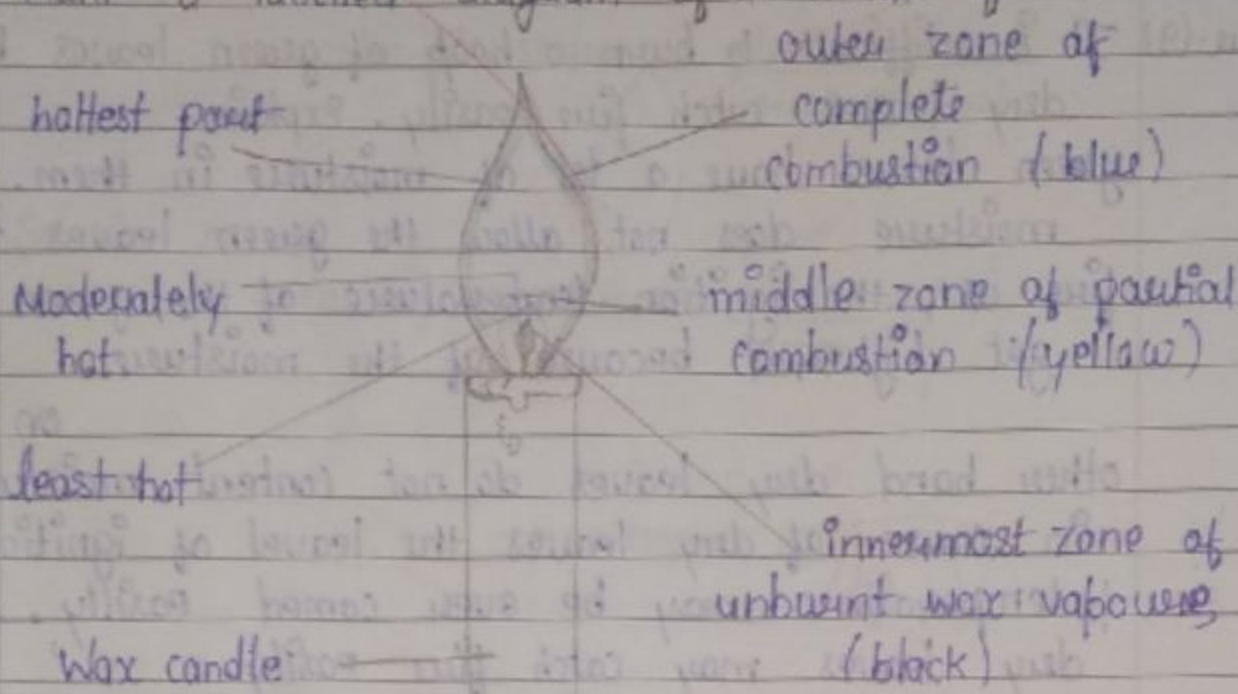
(b) Lpg is a better domestic fuel than wood.  
Lpg is a gaseous fuel it does not produce smoke and un-burnt carbon particles, which may cause respiratory problems.

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



Ans As we know Aluminium is a metal, also it is a good conductor of heat, so once we take the paper wrapped around on a aluminium pipe over the metal (aluminium) and the paper does not attain ~~and~~ it is a ignition temperature.

Ques-6) Make a labelled diagram of a candle flame.



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

The unit of calorific value of a fuel is expressed as a kilojoules per kilogram ( $\text{kJ/kg}$ )

Ques-8) Explain how  $\text{CO}_2$  is able to control fires.  
Carbondioxide is a non-combustible gas and it is also a bad supporter of combustion. it extinguishes fire in two ways:

- (i) it is heavier than oxygen. it lowers the fire like a blanket, it means that it simply cuts-off the

the contact between oxygen and fuel.

(2) In cylinders, carbon dioxide is kept in the liquid form, when heat released it expands enormously and cools down, this brings down the temperature of the fuel, which helps in controlling the fire.

Que-9) It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain.  
Green leaves have a lot of moisture in them, this moisture does not allow the green leaves to catch fire as the ignition temperature of the green leaves get heightened because of the moisture.

On the other hand dry leaves do not contain moisture so in case of dry leaves the level of ignition temperature may be over come easily. So, the dry leaves may catch fire easily.

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

The outermost zone of a flame used by the goldsmith for melting gold and silver because this flame undergoes complete combustion and it is the hottest part of the flame.

Que-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 (i) Given -

Mass of fuel  $\rightarrow 4.5 \text{ kg}$

Heat produced  $\rightarrow 180,000 \text{ kJ}$

(ii) Calorific value  $\rightarrow ? \left( \frac{\text{kJ}}{\text{kg}} \right)$

(3) Formula -

$$\text{Calorific value} = \frac{\text{Heat produced}}{\text{Mass of fuel}}$$

(4) Solution -

$$\text{Calorific value} = \frac{180000 \times 10^2}{4.5}$$

$$= 20000 \times 2$$

$$= 40000 \text{ kJ/kg}$$

Que-(12) Can the process of rusting be called combustion? Discuss. Combustion is a chemical process in which a substance reacts with oxygen and gives out energy during the process in the form of either heat or light or both. Rusting of Iron is an exothermic process as heat is released during rusting. Hence, it is a kind of slow combustion.

Que-(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?

Ans Ramesh's water will get heated in shorter time as he kept the beaker in touch the outermost part of the flame, which is the hottest part. Abida kept the beaker near the wick which is the yellow part of the candle flame, which was the least hot part.