J S U N I L T U T O R I A L

P U N J A B I C O L O N Y G A L I 0 1

Calorific Value The amount of heat energy produced on complete combustion of 1 kg of a fuel is called its Calorific value, expressed in terms of kJ/kg.

Ignition Temperature It is the lowest temperature at which a combustible substance can easily catch fire. Inflammable substances have very low ignition temperature.

Important Questions Only

Q.1: List the conditions under which combustion can take place.
Ans: Following conditions are necessary for combustion -
(i) The substance has to be combustible
(ii) It should have low ignition temperature
(iii) There should be adequate supply of air.

Q.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 can not be controlled by _____.

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

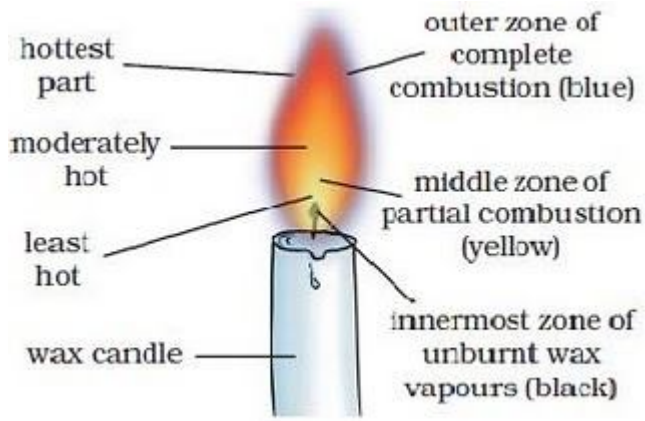
Q.3: Explain how the use of CNG in automobiles has reduced pollution in our cities.
Ans: CNG has replaced patrol and diesel as fuel in automobiles because these produce a lot of un-burnt carbon particles and emit carbon dioxide and nitrogen oxides and sulphur dioxide. These all gases are poisonous gases and cause various environmental hazards. But CNG is safe because it produces these materials in very small amounts thus reducing pollution in cities. Hence it becomes necessary to implement CNG in place of other fuels in automobiles to reduce the pollution.

Q.4: Compare LPG and wood fuels.
Ans:

LPG	Wood
1. It has more calorific value about 55000 kJ/kg 2. It is smokeless fuel. 3. Easy to transport. 4. Easily stored in cylinders. 5. Does not cause any environmental problem. 6. Have very low ignition temperature.	1. It has less calorific value about 17000 to 22000 kJ/kg 2. Gives out lot of smoke which is quite dangerous. 3. Difficult to transport. 4. Needs a lot of space to store. 5. To get it we need to trees to cut leading to deforestation which turn give rise to many natural and environmental problems. 6. Ignition temperature is not low.

Q.5: Give reasons:
a. Water is not used to control the fire involving electrical equipment.
b. LPG is better domestic fuel than wood.
c. Paper by itself catches fire whereas a piece of paper wrapped around an aluminium pipe does not.
Ans:
a) Water is a conductor of electricity, so it can easily conduct electric current and cause danger of electric shocks or short-circuits. Therefore water can not be used to control the fire involving electrical equipment.
b) There are a number of reasons because of which we can say LPG is definitely a better domestic fuel than wood. The reasons are - [Refer to the answer of Q.4 above].
c) Paper by itself catches fire easily because it has low ignition temperature but when wrapped around an aluminium pipe its temperature is lowered due to aluminium metal absorbing the heat supplied to paper. So it does not catch fire.

Q.6: Make a labeled diagram of a candle flame.
Ans:



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

Ans: Green leaves have moisture in them, which absorbs heat from them and raises their ignition temperature which does not allow them to catch fire easily. On the other hand dry leaves have low ignition temperature and so, burn easily.

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

Ans: A goldsmith uses the outer part of the candle flame for melting gold and silver because in this zone the temperature is the highest which helps to melt these metals easily.

Q.11: In an experiment 4.5 kg of a fuel was completely burnt. The heat produced was measured to be 180000 kJ. Calculate the calorific value of the fuel.

Ans: Heat produced after burning 4.5 kg fuel = 180000 kJ
Or, Heat produced after burning 1 kg fuel = (180000 ÷ 4.5) kJ = 40000kJ
So, Calorific value of fuel = 40000 kJ/kg

EXTRASCORE Questions

Short type Questions with their Answers

Q.1: What is produced during combustion?
Ans: Heat and light (flame).
Q.2: Name two substances which burn without flame.
Ans: Coal and charcoal.
Q.3: How does sun produces heat although it does not have air?
Ans: Sun produces heat due to nuclear reactions (nuclear fusion and nuclear fission).
Q.4: Name different types of combustions.
Ans: Rapid combustion, Spontaneous combustion and Explosions.
Q.5: Is there any ideal fuel?
Ans: No fuel is an ideal fuel.
Q.6: What is smoke?
Ans: It is un-burnt carbon particles.
Q.7: What are the effects of global warming?
Ans: Global warming leads to melting of polar glaciers, rise in sea level, coastal floods etc.
Q.8: Which chemicals give rise to acid rains?
Ans: Sulphur dioxide and Nitrogen oxides.
Q.9: Why does an empty paper glass catch fire easily but one having water in it does not burn?
Ans: The paper cup with water does not catch fire easily because when it is heated, the heat is transferred to water by conduction. So in the presence of water, the ignition temperature of paper is not reached. Hence, it does not burn.
Q.10: What are the conditions necessary for combustion?
Ans: For combustion of any substance following three conditions are essential -
1. Presence of air
2. Attaining the ignition temperature
3. The substance should be combustible.

Long type Questions with their Answers

Q.1: What are different types of combustion?

Ans: There are three different types of combustion as explained below –

(i) Rapid Combustion: The type of combustion in which combustible substance e.g., LPG, natural gas, etc. burns rapidly and produces heat and light is called rapid combustion.

(ii) Spontaneous Combustion: The type of combustion in which a material like, phosphorous suddenly burn on its own into flames without the application of any apparent cause is called 'Spontaneous Combustion'.

(iii) Explosion: When combustion takes place with sudden release of heat and light and a large volume of gas in the form of bang, it is called 'Explosion' as in case of crackers and bombs.