EXERCISE # 1

➢ VERY SHORT ANSWER TYPE QUESTIONS

Q.1 A circular blackish ring of unburnt particles are present in ..... zone.

Q.2 Define combustion.

Q.3 Write a difference between burning of a candle and burning of coal.

Q.4 What do you understand by combustible substances or fuels ?

Q.5 Is burning of magnesium combustion ?

Q.6 Give two examples of non-combustible substances.

Q.7 What is essential for combustion ?

Q.8 What do you mean by ignition temperature?

Q.9 Does a matchstick burn by itself ?

Q.10 What is the compsition of the head of the matchstick ?

Q.11 Which type of pollution occurs on burning wood ?

Q.12 When a burning charcoal piece is covered with a glass jar then burning of the piece stops, why ?

Q.13 Which will get fire first coal or kerosene ?

Q.14 Which is the most common fire extinguisher?

Q.15 Which poisonous gas is produced due to incomplete combustion of a fuel ?

Q.16 Name the substance used to extinguish fire involving electrical equipments.

EXERCISE # 2

➢ SHORT ANSWER TYPE QUESTIONS

Q.1 What are inflammable substances ?

Q.2 What would you do when the clothes of a person catch fire ?

Q.3 How is CO_2 able to control fire ?

Q.4 What do you understand by Explosion ?

Q.5 Which zone of a flame does a goldsmith use for melting gold and silver and why ?

Q.6 How can water boil in a paper cup without burning it ?

Q.7 What are the three zones of a flame ? Draw a labelled diagram of a candle flame.

Q.8 Why does the matchstick start burning on rubbing it on the side of the matchbox ?

Q.9 What are the essential requirements for produching fire ? On which principle the fire extinguisher works ?

Q.10 Paper by itself catches fire easily whereas a piece of paper wrapped around an aluminium pipe does not.

Q.11 Explain how water is able to control fires ?

Q.12 Define –
(a) Spontaneous combustion.
(b) Rapid combustion.

Q.13 (i) What is calorific value ? Write its unit.

(ii) 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.

Q.14 Why is it difficult to burn a heap of green leaves but dry leaves catch fire easily ?

Q.15 What do you understand by Global Warming? Give any two consequences of Global warming.

➢ LONG ANSWER TYPE QUESTIONS

Q.16 What are the characteristics of an ideal fuel?

Q.17 Why is CO_2 an excellent fire extinguisher ? Draw a diagram of fire extinguisher.

Q.18 What is acid rain. Write its harmful effects.

Q.19 How will you show that for a substance to burn, it is essential to reach its ignition temperature ?

ANSWER KEY

EXERCISE # 1

Sol.1 Luminous zone
Explanation : The blackish ring is due to the deposition of unburnt particles which are present in the luminous zone.

Sol.2 Combustion is a chemical process in which a substance reacts with oxygen of air to produce heat and light.

Sol.3 A candle burns with a flame while coal does not burn with a flame.

Sol.4 Those substances which burn or catch fire easily are called combustible substances or fuels e.g. wood, coal etc.

Sol.5 Yes, burning of magnesium is combustion as it produces heat and light.

Sol.6 Glass and Stone

Sol.7 Air or oxygen

Sol.8 The minimum temperature at which a substance catches fire and starts burning is called as ignition temperature.

Sol.9 No, a matchstick does not burn by itself because its temperature is lower than its ignition temperature.

Sol.10 The head of the matchstick contains antimony trisulphide and potassium chlorate.

Sol.11 Air pollution

Sol.12 It is due to the absence of oxygen (air) inside the jar. Oxygen is essential for burning.

Sol.13 Kerosene because its ignition temperature is lower than coal.

Sol.14 Water

Sol.15 Carbon monoxide gas.

Sol.16 Carbon dioxide (CO_2)

EXERCISE # 2

Sol.1 Those substances which have very low ignition temperature and can easily catch fire with a flame are known as inflammable substances. e.g. Petrol, LPG etc.

Sol.2 We will immediately cover the person with a blanket. It will prevent the entrance of air in the blanket. As a result, the fire will extinguish (air is necessary for burning).

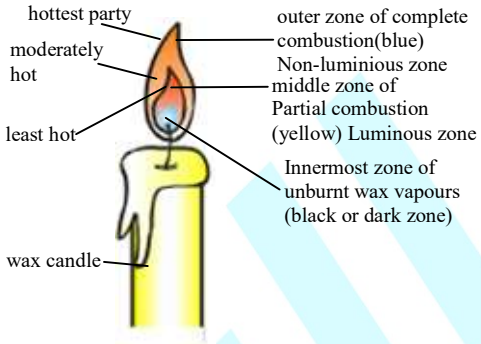
Sol.3 CO_2 is heavier than oxygen. So it covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled and CO_2 does not harm the electrical equipment.

Sol.4 The combustion in which a sudden reaction takes place with the evolution of heat, light, sound and gas is known as explosion e.g. ignition of a cracker.

Sol.5 A goldsmith uses outermost or non-luminous zone of a flame for melting gold and silver because this is the hottest part of the flame.

Sol.6 When we heat water in a paper cup then the heat supplied to the paper cup is transferred to water by conduction and the temperature of water goes on rising till it starts boiling. So, in the presence of water, the temperature of paper is not reached to its ignition temperature and the paper cup does not burn.

Sol.7 The three zones of a flame are dark zone, luminous zone and non-luminous zone.
Different zones of Candle flame



Sol.8 The rubbing surface contains powdered glass and a little red phosphorus. The head of the matchstick contains antimony trisulphide and potassium chlorate. When the matchstick is struck against the rubbing surface then some red phosphorus gets converted into white phosphorus which readily reacts with potassium chlorate of the head of the matchstick to produce sufficient heat to ignite antimony trisulphide. Thus the matchstick starts burning.

Sol.9 There are three essential requirements for producing fire. They are-

(i) Fuel

(ii) Air or oxygen

(iii) Heat (to raise the temperature of the fuel beyond the ignition temperature) The fire extinguisher removes one or more of the requirements which are needed for burning e.g. it prevents supply of air or to bring down the temperature of the fuel or both.

Sol.10 When a piece of paper wrapped around an aluminium pipe is heated than the heat is transferred to the aluminium pipe because Al is a good conductor of heat. So the temperature of the paper does not reach its ignition temperature. But in case of heating the paper itself, the ignition temperature of

the paper reaches readily and the paper catches fire.

Sol.11 Water cools the combustible material so that its temperature is brought below its ignition temperature. This prevents the fire from spreading. Water vapours also surround the combustible material. So the supply of air is stopped and the fire is extinguished.

Sol.12 (a) Spontaneous combustion : The combustion in which a material suddenly bursts into flames without any visible cause is known as spontaneous combustion e.g. spontaneous fires of forests occur due to the heat of the sun or due to lightning strike.

(b) Rapid Combustion : The combustion in which a material burns rapidly and produces heat and light is called as Rapid combustion e.g. phosphorus burns in air readily at room temperature.

Sol.13 (i) **Calorific value** of a fuel is the amount of heat energy evolved on complete combustion of 1 kg of a fuel. Its unit is kilojoule per kg (kJ/kg).

(ii) The heat produced by burning 4.5 kg of a fuel = 180,000 kJ. The heat produced by burning 1 kg of a fuel = 180,000 kJ/4.5 kg = 40,000 kJ/kg

So, the calorific value of the fuel = 40,000 kJ/kg

Sol.14 For the combustion, the substance must be heated to its ignition temperature. If the ignition temperature is not reached then the combustion does not start. Green leaves contain moisture which increases their ignition temperature. Hence it is difficult to burn a heap of green leaves. The ignition temperature of dry leaves is low. So, they catch fire easily.

Sol.15 **Global Warming** is the increase in temperature of the atmosphere of the Earth due to the increased concentration of gases like CO_2.

Consequences of Global Warming

1. Global warming leads to the melting of glaciers. So the level of sea water will increase and floods will take place.
2. Higher global temperature may increase the infectious diseases like malaria, dengue, yellow fever etc.

Sol.16 The characteristics of an ideal fuel are –

(i) It should be readily available and cheap.

(ii) It should produce a large amount of heat (high calorific value)

(iii) It should burn without giving any harmful gases.

(iv) It should burn easily in air at a moderate rate (proper ignition temperature).

(v) It should not leave behind any undesirable substances after burning.

Sol.17 CO_2 can be used as an extinguisher for fires involving electrical equipment and inflammable materials like petrol. It can be stored at high pressure as a liquid in cylinders. On releasing it from the cylinder, it expands enormously in volume and cools down. Thus, it not only forms a blanket around the fire but also brings down the temperature of the fuel. Hence, it is can excellent fire extinguisher.

Sol.18 When rain water dissolves oxides of sulphur and nitrogen (produced due to burning of coal, petrol etc in the

atmosphere) then acids are formed. Such rain is known as acid rain. Acid rain contains mainly sulphuric acid and nitric acid.

Harmful effects of acid rain

1. Acid rain damages leaves of trees, plants and retards the growth of certain crops like peas, beans etc.

2. It damages buildings and statues specially made of marbles and metals e.g. Taj Mahal at Agra is being affected by acid rain.

3. It is toxic to aquatic life.

Sol.19 We make two paper cups by folding a sheet of paper. Some water is poured in one of the cups. Then we heat both the cups separately with a candle. We will observe that the paper cup without water (empty) burns and the cup having water does not burn. This is because the ignition temperature of empty paper cup reaches quickly on heating and it burns. But in case of the cup with water, the heat supplied to the paper cup is transferred to water by conduction. So, in the presence of water, the ignition temperature of paper is not reached and it does not burn. Hence for a substance to burn, it is essential to reach its ignition temperature.