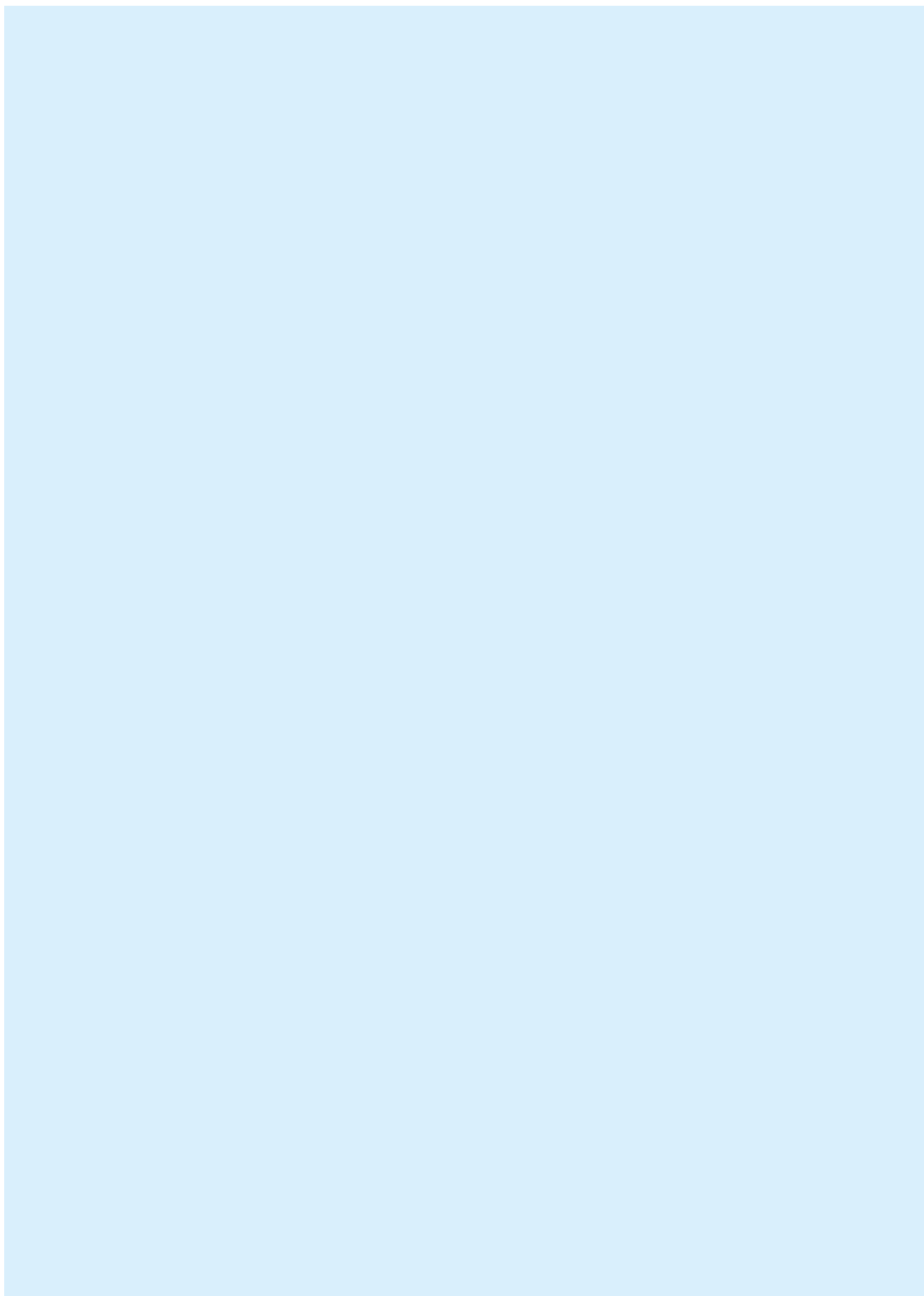


01

A combustible substance burnt for releasing and using its heat energy is known as a Fuel. Usually, fuels are compounds of carbon and hydrogen, thus they combine with oxygen on burning and liberate carbon dioxide and water vapour. A fuel is termed "Ideal" as it seems to be perfect in composition with little or no impurities. On its large scale use, it produces tremendous results with ease of availability, storage and safety by one and all. Being a fuel it is necessary to know its value. It is called calorific value.

- (a) What is a fuel ? Write few examples of fuels.
- (b) What are the characteristics of an Ideal fuel (or good fuel) ?
- (c) The calorific value and ignition temperature of fuel P are 55 kJ/g and 80 °C and these values for fuel Q are 80 kJ/g and 10 °C respectively. On burning, the fuel P produces CO₂ and H₂O while the fuel Q produces CO₂, CO and SO₂. Write three points of relative advantages and disadvantages of these two fuels.
- (d) Which fuel is the best among the two fuels P and Q that has more advantages and less disadvantages ?

Your solution here:



02

The size of the air hole determines the type of flame produced. The Bunsen burner can produce three different types of flames at different temperatures on heating like cool, medium and hot flame.

- (a) Which type of flame with its characteristics is produced when the air hole of a bunsen burner is closed fully ?
- (b) What is the name of this flame ?
- (c) What type of flame is produced when the air hole of a bunsen burner is opened to allow gas to burn completely in sufficient air ? What is its temperature and use ?
- (d) Which type of flame makes a noise ? What is it called ? Indicate its temperature and use.

Your solution here:

03

Acid rain is the rain that has a higher acidity level (or low pH) of 4 than the normal rain. The main air pollutants are sulfur dioxide and nitrogen oxides. These air pollutants react with oxygen and water to form Acid rain. Some of the undesirable effects of acid rain are:

- (i) It lowers the pH of soil and affects the healthy growth of plants and crops.
- (ii) The chemical reactions of acid rain release toxic metals which affects the growth of plants when they leach into water, they destroy marine life.

Buildings and statues made up of carbonates such as limestone or marble are weathered away as they can react with acid rain. It damages the bark and leaves of trees and makes them vulnerable to diseases or unable to carry out photosynthesis.

- (a)
 - (i) What are the two air pollutants which are the main cause of Acid rain ?
 - (ii) Which acids are formed by these two air pollutants when they react with water and oxygen in air ?
- (b) What is the pH of Acid rain ?
- (c) What are the effects of Acid rain ?

Your solution here:

04

All the fuels in solid, liquid or gaseous state produce different amounts of heat energy on burning. Some fuels produce more heat whereas others produce less heat. The usefulness of a fuel is measured in terms of its calorific value. Higher the calorific value, better the fuel will be. The amount of heat produced by burning a unit mass of the fuel completely is known as its Calorific value. The unit of its mass is usually measured in "gram". The amount of heat produced by burning 1 gram of a fuel completely is called its Calorific value. The common unit of measuring Calorific value is kilojoules per gram (kJ/g) or kJ/kg).

- Which type of fuels produce heat energy on burning ?
- What is the calorific value of a fuel ? How it is measured ?
- Write the names of fuels in the order of decreasing calorific values (keeping the fuel with highest calorific value first:

Biogas, Kerosene, Wood, Petrol, Hydrogen gas, Methane.

Your solution here:

05

Combustion is an important chemical reaction. In the world today, the burning of fuels such as petrol, natural gas and coal provides more than 90% of energy needed for transport, industries and homes.

Combustion can be classified into complete and incomplete.

A complete combustion takes place when a substance burns in sufficient amount of oxygen. Carbon dioxide is produced.

An incomplete combustion takes place when a substance burns in an insufficient amount of oxygen. Carbon monoxide or soot are produced.

Carbon monoxide is an air pollutant released from the car exhaust pipes.

- (a) What is meant by air pollutant ?
- (b) Explain how the carbon monoxide is produced from the car exhaust system.
- (c) Explain why carbon monoxide is poisonous.

Your solution here: