Chapter Four

Metals, Alloys And Rusting:

- Even though there are many different types of metals, they all have certain common properties.

Some properties of metals:

(i) Metals are solids.
(ii) They have high melting points.
(iii) They can conduct heat and electricity very well i.e., heat and electricity can pass through them very well.
(iv) Most metals are lustrous which means that they have shiny surfaces.

- Non metals usually refer to gases.
- Some of the properties of non metals are that:

(i) They are poor conductors of heat and electricity i.e., heat and electricity cannot pass through them very well.
(ii) They are not lustrous i.e. they do not have shiny surfaces.
(iii) They have low melting points.

Uses of some metals:

- A metal such as copper is used in making electrical wires.
- Aluminum is used in the making of cooking utensils and roofing sheets.

Uses of some non metals:

- Chlorine is used in the purification of water.
- Oxygen is used for respiration and welding.

Semi conductors:

- Metals are very good conductors of electricity.
- This means that electricity can pass through metals very well and easily.
- There are certain materials which do not conduct electricity at all.
- They are referred to as insulators and examples are wood and plastic.
- There is also another group of materials which are neither conductors nor insulators.
- They are called semi metals or semi conductors.

Alloys:

- An alloy is a mixture or a combination of two or more metals.
-These metals are heated in separate containers till they melt.
- They are then mixed together in one container.
- When they cool and become hard, they form an alloy.
- Many pure metals have certain bad properties which make them not too good to be used.

- They may be too soft or rust very easily.
- In order to remove these bad properties from those metals, they are combined with other metals to form alloys.
- For example, pure iron which easily rusts is changed or converted into an alloy called steel, before it is used to make items.
- Steel does not easily rust.
- Also because aluminum is not too strong a material, it is converted into an alloy called duralumin, before it is sometimes used.
- Duralumin is a material which is very strong, and it is used in making aeroplanes.

Some alloys and their composition:

Alloy	Composition
Bronze	Copper and tin
Brass	Copper and zinc
Duralumin	Aluminum and copper
Steel	Iron, copper and chromium

The rusting of iron:

- The rusting of iron occurs when the iron is exposed to or comes into contact with water and oxygen.
- If the iron only comes into contact with only water, then it will not rust.
- Also iron will not rust if it comes into contact with only oxygen.
- This therefore tells us that before the iron can rust, then it must come into contact with both water and oxygen.
- When the iron rusts, it turns into a brown material which we call rust.

Prevention of rusting:

- There are various methods which can be used to prevent the rusting of iron and other metals.
- A metal such as iron can be prevented from rusting by painting it or by greasing it.
- In the painting of the iron, the iron is covered with paint and in the greasing of the iron, it is covered with a type of oil called grease.
- By covering the iron with the paint or the grease, rusting cannot occur.
- This is because the paint or the grease will prevent the iron from coming into contact with oxygen and water.
- By so doing, the rusting of the iron cannot occur.

Questions:

(1) What is an alloy?

Ans:

- It is a combination or a mixture of two or more metals.

(2) Why do we convert some metals into their alloys before they are used?

Ans:

- This is to remove certain bad properties found in these metals.

(3) What is the main difference between iron and steel?

- The main difference is that iron easily rusts, but steel does not easily rust.
- Apart from that, iron is a metal while steel is an alloy.

(4) Write down the composition of brass.

Ans:

- Brass is made up of copper and zinc.

(5) List two properties of metals.

Ans:

- They are good conductors of heat and electricity.
- They have high melting points.

(6) What is an insulator?

Ans:

- It is a material through which electricity cannot pass.

(7) When is iron said to have rusted?

Ans:

- Iron is said to have rusted when it is exposed to water and oxygen, and the iron is changed into a brown material called rust.

(8) Give one way of preventing a metal from rusting.

Ans:

- By painting the metal.

(9) Kofi covered his iron toy gun with grease, and the toy did not rust. Explain why this is so.

Ans:

- The toy which is made of iron did not rust because the grease prevented the iron from coming into contact with water and oxygen.

(10) Give one use of copper.

Ans:

- It is used to make electrical wires.