Chapter 3

Synthetic Fibres and Plastics

What are Synthetic Fibres?

• Fabrics are made by weaving fibres (or thread) obtained from natural or artificial sources.

• Fibres are classified into two categories:

(a) ***Natural Fibre:*** The fibers which are obtained directly from plants or animals are called natural fibers. For example, cotton is a natural fiber.

(b) ***Synthetic Fibre:*** Synthetic fibers are fibers that are made by humans through chemical synthesis. For example, nylon is a synthetic fiber. Synthetic fiber is also called man-made fiber.

* Question: Jute is _____ fiber. Fill in the example.

Answer: **Jute is the natural fibers that are commonly used in the production of bags. Jute is extracted from the stem and outer skin of the jute plant. Therefore, the correct answer is a natural fiber.**

Types of Synthetic Fibres

• The list of some important synthetic fibres are:

(a) Rayon:

⇒ It is obtained by the chemical treatment of wood pulp.

⇒ It resembles silk and is hence called artificial silk.

⇒ Rayon is mixed with cotton to make bed sheets or mixed with wool to make carpets.

(b) Nylon:

⇒ It is the first fully synthetic fibre that is prepared without using any natural raw materials.

⇒ It is prepared from coal, water, and air.

⇒ It is strong, elastic, lustrous, light and easy to wash.

⇒ Its thread is stronger than the steel wire.

⇒ It is commonly used for making socks, ropes, tents, toothbrushes etc.

(c) Polyester:

⇒ It is made up of repeating units of chemical compounds called an ester.

⇒ It is wrinkle-free and easy to wash.

⇒ It is commonly used to make dress material, shirts etc.

(d) Acrylic:

⇒ It is a synthetic fibre that resembles wool.

⇒ It is affordable, durable and available in several colours.

⇒ It is commonly used to make shawls, sweaters, blankets, etc.

Characteristics of Synthetic Fibre

All the synthetic fibres are manufactured by processing raw materials of petroleum origin in a number of ways. The raw materials of petroleum origin are called Petrochemicals. The characteristics of synthetic fibre are shown below:

→ Synthetic fibres are durable.

→ Synthetic fibres dry faster.

→ Synthetic fibres are not costly.

→ Synthetic fibres are easy to maintain.

→ Synthetic fibres are stronger

→ Synthetic fibres do not shrink when washed.

*Question: Why should we not use synthetic clothes during kitchen hours?

Ans- The synthetic fibres melt on heating and catch fire immediately which can be very disastrous. As we know that the fabric of synthetic fibres melts and sticks to the body. That's why during kitchen hours we should not use synthetic clothes.

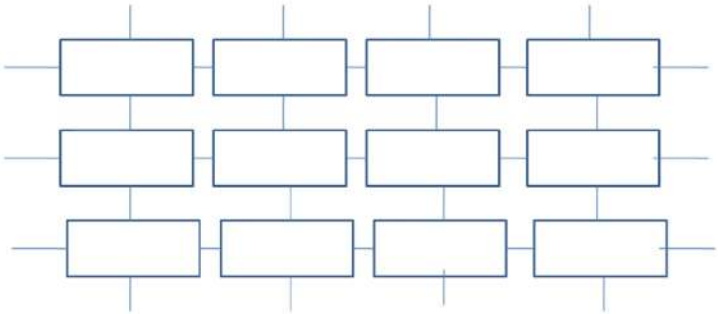
Plastics

• Plastic is a polymer that can be moulded into different shapes. The word ' plastic ' originates from the Greek word 'plastikos' which means 'that can be molded or shaped.

• Plastic articles are available in all possible shapes and sizes because plastic is easily mouldable and can be shaped in any form.

• The two different kinds of arrangement of polymer found in plastics are linear and cross-linked arrangements. Plastics are also a polymer. The structure of linear and cross-linked arrangements of monomers are:

LINEAR ARRANGEMENT



CROSS ARRANGEMENT

• The polythene is the type of plastic that contains an ethylene monomer.

• The plastics are of two types:

(A) ***Thermoplastics:***

Plastics that get deformed easily on heating and can be bent easily are known as Thermoplastics. Thermoplastics are of two types: Polythene and PVC.

Polythene – It is commonly used for making plastics bags. It contains ethene as a repeating unit (monomer).

PVC – (Polyvinyl chloride) is a strong but lightweight plastic. It can be rigid (which is used in construction) or flexible (which is used for making bottles, non-food packaging, and bank cards).

(B) ***Thermosetting plastics:***

Plastics which when molded once, can not be softened by heating. Thermosetting plastics are of two types: Bakelite and Melamine.

Bakelite – It is a poor conductor of heat and electricity and hence, is used for making handles of utensils, electrical switches, etc.

Melamine – It is a versatile material that is fire resistant and can be tolerated heat better than other types of plastics. Hence, it is used for making floor tiles, fabrics that resist fire, and kitchenware.

Plastics as Materials of Choice

The characteristics of plastics are:

(A) Plastic is non-reactive and non-corrosive.

(B) Plastic is light, strong, and durable.

(C) Plastics are poor conductors

*Question: Which plastic is used to make: (A) Non-stick coating on Cookware and (B) Flame-resistant Uniforms?

Answer: Teflon is used as a non-stick coating on cookware. Nowadays people prefer to take Teflon-coated cookware because it is used to be easy in cooking. The coat of fireman used to have a coating of melamine plastics to make them flame resistant. Therefore, (A) is Teflon and (B) is Melamine

Plastics and the Environment

There are two kinds of material present in the Environment concerning decomposition.

(a) ***Biodegradable Material-*** A material that gets decomposed through natural processes, such as action by bacteria, is called biodegradable material. For example – Cotton, jute bags, etc. Cotton and jute bags are obtained from natural fibre and as we know that natural fibres get decomposed easily.

(b) ***Non-biodegradable Material*** - A material that is not easily decomposed by natural processes, is termed as Non-biodegradable material. For example – Plastics. Plastics are obtained from synthetic fibre. Plastics are polymer and made up of chains or rings of linked repeating subunits which are called monomers. It is not easily decomposed by natural processes.