

Synthetic Fibres and Plastics

Check point 1

Q. 1. Out of rayon, cotton, nylon and silk, which fibre is derived from chemicals?

Answer: Nylon is derived from chemicals and is prepared from coal, water and air under proper conditions. Rayon is also a synthetic fibre but it is made by the chemical treatment of wood pulp. The raw material used here is wood pulp which is obtained from nature.

Q. 2. From where synthetic fibres are obtained?

Answer: Synthetic fibres are man-made fibres obtained by joining small units of chemicals to form a large chain. This large chain is called a polymer. These chains are made using chemical treatments. The raw materials may be natural or artificial.

Q. 3. Name the man-made fibre, made from the cellulose polymer.

Answer: Rayon is a man-made fibre which is made from wood pulp. Wood pulp contains cellulose.

Check point 2

Q. 1. How is polyester fibre made?

Answer: Polyester is a synthetic fibre which is made up of repeating units of a chemical called ester. Ester is a chemical which has a fruity smell.

Q. 2. Which fibre is chemically identical to man-made fibre, rayon?

Answer: Cotton is the fibre chemically identical to rayon. Cotton contains cellulose polymer. Rayon is made from wood pulp which also contains cellulose.

Q. 3. For what the term PET is usually used? Define this term.

Answer: PET stands for Polyethylene terephthalate. PET is a commonly used polyester which is used for making bottles, utensils, wires etc. It is a thermoplastic material; it can be remoulded into different shapes when heated.

Check point 3

Q. 1. Choose the thermoplastic and thermosetting plastic from the following:

Melamine, PVC, polythene, nylon, Bakelite

Answer: Thermoplastic – polythene, PVC, nylon

Thermosetting plastic – bakelite, melamine

Thermoplastics are plastic materials which get deformed on heating and can be bent easily.

Thermosetting plastics are plastics which can only be moulded once. If they are heated, they tend to break.

Q. 2. Which is better material for constructing handle of a pressure cooker -a thermoplastic or a thermosetting plastic?

Answer: The handle of the pressure cooker should not melt or get remoulded on heating. Also, the handle should be strong to hold the weight of the pressure cooker. Thermosetting plastics satisfy both of the above conditions. Hence, thermosetting plastic is the better material to construct the handle.

One of the commonly used materials for making handles is bakelite, as it is a poor conductor of heat and electricity.

Q. 3. What type of plastic is used to make electric switches?

Answer: Generally, thermosetting plastics are stronger than thermoplastics. Also on application of heat, they cannot be melted or reshaped. Bakelite which is a poor conductor of electricity is used to make electric switches.

Check point 4

Q. 1. Name one material used for non-stick coating on cookwares.

Answer: Teflon is one material used for non-stick coating on cookwares. Oil and water do not stick to these surfaces.

Additional Information

Teflon is a thermoplastic polymer made of chemical units called tetrafluoroethylene.

Q. 2. State the property of plastics due to which switches and plugs are made up of plastics.

Answer: Plastics are bad conductors of electricity. That is the reason why switches and plugs have an outer covering made of plastic; to avoid direct contact with the metallic part so that you would not get electric shock.

Q. 3. Why plastic is lighter than metal?

Answer: Plastic and metal differ in their arrangement of molecules. Metals have a closely packed arrangement of atoms. The weight is distributed over a small space and therefore metals are heavy.

Plastic is made up of long chains of certain chemical units. They have a loosely packed arrangement. The weight is distributed over a large space in this case and therefore plastics are light in weight.

Check point 5

Q. 1. Do the biodegradable materials cause environmental pollution? Name two biodegradable products.

Answer: No, biodegradable materials do not cause environmental pollution if they are properly degraded. Wood, paper are examples of biodegradable products.

Q. 2. Is cotton cloth biodegradable or non-biodegradable?

Answer: Cotton cloth is a biodegradable material. It takes approximately 2-5 months to degrade cotton cloth.

Q. 3. What do you understand by 4R principle? Why should we remember this principle?

Answer: The 4R principle is Reduce, Reuse, Recycle and Recover. This principle is environment friendly and would help reduce environmental pollution to an extent.

The principle directs people to

- reduce the usage of resources. Use them only if necessary.
- reuse the resources (or materials) if possible. For example, reusing cloth bags for shopping.
- recycle materials if they are no longer usable.
- recover materials; converting waste into usable resources.

Chapter Test

Q. 1. Which fibre is commonly used for making ropes?

Answer: Nylon is a man-made fibre which is commonly used for making ropes. Nylon fibres are strong, elastic and light. They are also durable. Jute is a natural fibre which is also used for making ropes.

Q. 2. Name the fibre that burns readily with the smell of burning paper.

Answer: Cotton and rayon both burn with the smell of burning paper because cotton, rayon and paper are made up of cellulose units.

Q. 3. Give two examples of thermoplastics.

Answer: Thermoplastics are plastics which deform on heating and can be bent easily. The examples of thermoplastics include polythene, PVC.

Q. 4. What is a natural fibre? Give one example.

Answer: Natural fibre is the fibre which is obtained from plants or animals. Cotton is an example of a natural fibre.

Q. 5. Which material is used in making electrical switches?

Answer: Bakelite is used in making electrical switches. It is an example of thermosetting plastic and is a bad conductor of electricity.

Q. 6. Write the use of PET.

Answer: PET is a polymer which is made up of chemical units named ethylene terephthalate. This is one of the commonly used polyesters and is thermoplastic in nature. PET is mainly used to make bottles and containers for storing food, beverages, soft drinks etc. It is also used in many other consumer products.

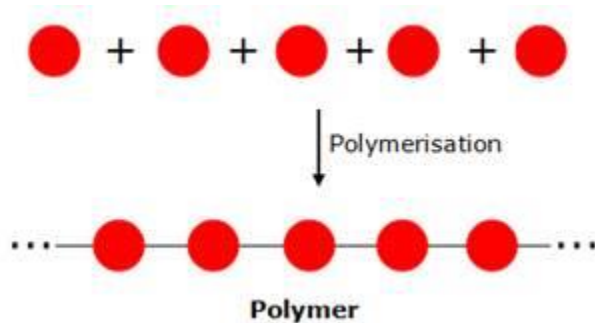
Q. 7. Write a product made of terylene.

Answer: Terylene belongs to the family of polyesters. Terylene can be drawn into thin fibres that can be woven like any other yarn. Terylene is used in the manufacturing of nets, ropes, raincoats, jackets etc.

Q. 8. By which process synthetic polymers are made?

Answer: Synthetic polymers are made by the process of polymerisation. Polymerisation is the process in which individual molecules (which are called monomers) join to form a bigger molecule (called polymer). In other words, the polymer is made up of repeating units of monomers.

If a single red circle denotes a monomer, then polymerisation can be illustrated as:



Q. 9. Cotton and jute are animal fibres. Is it correct?

Answer: No, cotton and jute are plant fibres because they are obtained from plants.

Q. 10. Give four important properties of plastics.

Answer: Plastic plays an important role in our life because

- Plastic is light and strong. The weight of plastic is less when compared to that of metal.
- Plastic is very cheap. So, plastic bags and other plastic items have low cost.
- Plastic does not react with air and water, and so it does not corrode easily. Hence it is durable.

- Plastic can be remoulded into different shapes and sizes. It can be used for various purposes.

Q. 11. Write one advantage and one disadvantage of using clothes made from synthetic fibres.

Answer: Advantage: Clothes made from synthetic fibres dry quickly. They are cheap and durable as well when compared to clothes made from natural fibres.

Disadvantage: Synthetic fibres easily catch fire. On heating, they melt. So if the clothes made from them catch fire, the fibre melts and sticks to the body causing burns.

Q. 12. Write the uses of plastics in healthcare industry.

Answer: Plastic is used in healthcare industry in different ways:

- Gloves, masks worn by doctors are made from plastics.
- Plastic is also used to construct implants such as artificial valves, pacemakers etc.
- Plastic also plays a key role in the packaging of medicines.
- Certain medical devices which were previously made from metal components are made from plastics nowadays making them light in weight.

Q. 13. What are the uses of nylon and rayon?

Answer: Both rayon and nylon are synthetic fibres.

Rayon mixed with cotton or wool is used to make bed sheets, carpets, clothes etc.

Nylon is mainly used to make ropes, socks, tents, toothbrushes etc.

Q. 14. Polyesters are preferred for making dress materials. Why?

Answer: Polyesters are preferred for making dress materials. The main reasons include:

- They have light weight.
- They are easy to wash.
- They do not wrinkle easily.
- They are cheap when compared to dresses made from natural fibres.

Q. 15. Write the process of preparing rayon.

Answer: Rayon is a man-made fibre also known as artificial silk. The raw material involved in preparing rayon is wood pulp. Rayon is made by certain chemical treatments of wood pulp.

Q. 16. What do you mean by polymerisation?

Answer: Polymerisation is the process of joining together of monomers to form a long chain molecule called polymer. Monomers are the individual units present in a polymer.

Q. 17. List some properties and uses of acrylic and polyester.

Answer: Acrylic and polyester are man-made fibres.

Acrylic:

- Acrylic is lightweight and soft.
- Acrylic is thermoplastic. It deforms easily upon heating.
- It resembles wool, but it is not as costly as wool.
- Clothes made from acrylic are available in a variety of colours.
- It is used to make paints, glass, socks, gloves, sweaters etc.

Polyester:

- Fabric made from polyester does not wrinkle easily. It is durable.
- Clothes made from polyester are easy to wash and are cheap.
- Polyester is thermoplastic in nature. It deforms and bends easily upon heating.
- It is used to make bottles, safety belts, carpets etc.

Q. 18. Why should we minimise the usage of plastics?

Answer: Plastics are non-biodegradable in nature. Over usage of plastic bags can lead to accumulation of plastic waste in garbage cans. Disposal of plastic wastes is an issue. Burning plastic wastes in air would pollute the air. Disposing plastic in water endangers aquatic life and pollutes water. Since plastic is non-biodegradable, it cannot be decomposed by natural processes. Therefore, the usage of plastics should be minimised.

Q. 19. Why are microwave cookwares made of plastic?

Answer: Microwave cookwares are used in microwave ovens for cooking food. These microwave vessels should be able to withstand high temperatures. Special plastics are used to make the cookwares, so that food is cooked by the heat of microwave oven without affecting the plastic vessel itself.

Q. 20. Why is acrylic considered as a cheap substitute of wool?

Answer: Acrylic is a man-made fibre. Natural wool and the clothes (for example, sweaters) made from it are quite expensive. Acrylic is a soft lightweight fibre which appears to resemble natural wool. The cost of acrylic is low when compared to the cost of natural wool. Therefore, acrylic can be considered as a cheap substitute of wool.