

01 Synthetic polymers have become an integral part of our lives. They are replacing metals, wood and natural fibres due to their durability and less wear and tear. They are non-biodegradable i.e. they are not decomposed in nature by microorganisms, hence cause pollution. The advantages of synthetic polymers are far more than their disadvantages. With careful use, they can be a boon to mankind.

1. Manufacturing synthetic fibres is actually helping conservation of forests when compared with the manufacture of natural fibres. Explain.
2. The polythene bags carelessly thrown here and there pose a big threat to the environment and to the animals. Give reasons.
3. Polythene bags remain on the land for several years depriving space for biodegradable substances to decompose.

1. Synthetic fibres are manufactured by petrochemicals that helps in the conservation of forests, but the manufacture of natural fibres requires raw materials from plants and animals. If plants or trees are cut down in the forest for manufacture of cotton clothes, it does not help to conserve forests. If animals like silk moth and wool of sheep yak and goat are used for manufacture of natural fibres like silk and wool, even this also will not help to conserve plants or trees in the forests as both the silk worms and above animals for formation of silk and wool are dependent on plants and trees.

2. Polythene bags block the drains and water bodies. When this bags are consumed by animals, it blocks their digestive track and forms a lining in the stomach of cows that can cause death. It also destroys the respiratory system of animals.
3. The chemicals present in polyethene bags are insoluble in soil. The micro-organisms in soil cannot degrade them naturally. Hence, remain in the soil by polluting both the soil and water. Other biodegradable substances are devoid of place for microbial degradation.

02

Polyester is a synthetic fibre. Fabrics made from this fibre do not get wrinkled easily. It remains crisp and easy to wash and dry. It is quite suitable for making dress materials. It can be mixed with a natural fibre to give a blended fibre which has properties of both the fibres.

1. Why synthetic fibres are resistant to wrinkles ?
2. Which fibre absorbs more amount of water ?
3. Why blended fabrics have more properties than natural and man-made synthetic fibres ?

1. Synthetic fibres are resistant to wrinkles as they have greater stability. These fibres do not bend like natural fibres. They remain stiff without absorbing water when wet and dry faster in any season.
2. Cotton a natural fibre absorbs 25 times its weight of water.
3. Blended fabrics have dual properties of both natural and synthetic fibres. So, they have more properties when compared individually of natural and synthetic fibres.

03

Tensile strength of a fibre determines its strength due to a mild or heavy load. It is the maximum amount of stress that it can be subjected to before the material breaks or tears away. The tensile strength of a polymer depends on the arrangement of molecules that make up the polymer, as well as the orientation of the polymer. Acrylic is a substitute of wool. It is used to make wide range of products.

1. Which fibre has high tensile strength ?
2. Parachute and the ropes for rock climbing are made up of nylon and not steel ?
3. Wool is expensive. It is replaced with Acrylic having better properties than natural fibre Wool. Give reasons.

1. Nylon has high tensile strength.
2. Nylon is stronger than steel as it is a synthetic polymer with strong polyamide linkages that makes it stronger. Steel is an alloy of few metals.
3. Wool is a natural fibre extracted from a variety of animals. It shrinks, absorbs lot of water and takes more time to dry. Small gaps in wool allow free flow of air that acts as an insulator. Thus, it gives very good warmth to the wearer. Acrylic products are made from a blend of chemicals. It does not shrink or wrinkle, absorbs less water and dries faster. It is warmer than wool. Acrylic is blended with wool to make materials for suits and trousers. Above all, it is cheap and affordable by anyone.

04

X is a thread from which Y is made. If Y is of natural origin it is called Z fibres and if it is prepared by man it is called W fibres. Nylon, rayon, polyester, etc. are examples of W.

1. What is X ?
2. What is Y ?
3. What is Z ?
4. What is W ?

1. X is a thread obtained from natural fibres.
2. Arrangement of X threads horizontally and vertically helps to make cloth Y.
3. As Y are of natural origin, Z is a natural fibre
4. X is a fibre from which cloth Y is made. Z is a natural fibre because Y is of natural origin. W is a synthetic fibre.

05

A student performs an experiment. He cuts out equal sized squares from each of the three fabrics - nylon, wool and cotton and weighs them. He then places each fabric square into a beaker containing 500 ml of water. After 10 minutes he removed the fabric squares from the water, weighed them and recorded his observations in a table given below.

Fabric	Mass before soaking (g)	Mass after soaking (g)
Nylon	30	43
Wool	35	70
Cotton	40	50

1. Which fabric absorbed less water ?
2. What is the difference between water absorption capacity of natural fabrics wool and cotton ?
3. After soaking in water, which fabric becomes the heaviest ?

1. Nylon being a synthetic fabric absorbed less amount of water i.e., only 13 ml.
2. Wool absorbed double the amount of water i.e., $70 - 35 = 35$ ml.
Cotton fabric absorbed only 10 ml of water
i.e., $50 - 40 = 10$ ml $\frac{1}{4}$ th the mass of fabric.
3. Fabric wool absorbed double its mass of water. So, it is the heaviest fabric.