Synthetic Fibres And Plastics

Improve your learning

Q. 1. Explain why some Fibres are called synthetic?

Answer : There are two categories of Fibres:-

1) **Natural** – Obtained from plants and animals.

2) **Man-made** – prepared by a scientist in labs with the help of reagents. Since some Fibres belong to the category of man-made, hence they are synthetic.

Q. 2. Give reasons why plastic containers are used as storage devices?

Answer : Plastic containers are used as storage devices since they are

a) **Light, Cheap and Durable** – Easy to handle and last longer.

b) **Cost effective** – They cost less compared to metal containers.

c) **Inert Nature** – Plastic containers are chemically inert since they do not react with the other substances. In case of metal containers, a substance placed inside reacts with the metal and forms a different substance.

d) **Insulator** - Plastic is the bad conductor of heat so the food kept in it remains hot for longer period of time.

Q. 3. Classify following materials which can be, cannot be recycled.

Plastic toys, electrical switches, plastic chairs, ball point pens, plastic containers, cooker handles, plastic bottles, carry bags, tumblers, tooth brush, plastic chapels. Plastic plates, plastic buckets

Answer : Can be Recycled - Plastic toys, plastic chairs, , plastic containers, plastic bottles, tumblers, plastic chapels, plastic plates and plastic buckets.

Reason – They all are thermoplastic so they can be recycled again and again

Cannot be Recycled – electrical switches, tooth brush, carry bags, ball point pens, and cooker handles.

Reason – They are thermosetting plastic so once formed they solidify to such an extent that it is impossible to recycle them.

Q. 4. If electric switches are made by thermoplastics what would happen?

Answer : 1) We Know that thermoplastic is kinds of plastics that have a low melting point.

2) So in case of voltage fluctuations, the current in the wire increases due to which temperature increases.

3) The heat is enough to melt down the electrical switches and after some time upon being cooled the switch will assume a different shape which is undesirable.

Q. 5. Thermoplastics are eco-friendly than thermosetting plastics. What do you say? Why?

Answer : Thermoplastics can undergo the process of cooling and heating again and again in order to change it to the desired shape however thermosetting plastics once formed cannot be changed to any other shape again. So indeed thermoplastics are eco-friendly as they are recyclable and can be reused again and again while thermosetting plastic once becomes trash has to be dumped or thrown away which leads to the pollution.

Q. 6. Explain following.

a) Blending b) Biodegradable c) Recycling d) Decomposition

Answer : a) Blending: It is the process of mixing two different materials into one. The materials are generally the solid one that is mixed with or without the use of small amount of liquid. This technique is used in synthesizing fabrics as blended fabrics are cheap and are of good quality.

b) Biodegradable: Substance that can be disintegrated by the living microorganism for instance bacteria into much smaller chunks. For example, Cotton is biodegradable and can be recycled back after it is used.

c) Recycling: It is the method through which the old/waste/used material can be utilized again. It plays a very positive role in the environment as the resources present already can be used again and again without generating new materials so the chances of resources getting depleted get less.

d) Decomposition: The process in which complex material is disintegrated into smaller pieces by the microorganism such as bacteria when sufficient sunlight, water, and oxygen is available.

Q. 7. Match the following.

i) Polyester	a) kitchenware
ii) PET	b) artificial silk
iii) Rayon	c) many monomers
iv) Nylon	d) electric switches
v) Melamine	e) Code 1
vi) Polythene	f) popular dress material
vii) Bakelite	g) stronger than any fiber

Answer : (i) - f

Clothes made from polyester are easy to wash, affordable and durable.

(ii) – e

Code 1 is the special number that is given to PET by the government that tells us that the given stuff is made up of PET.

(iii) -b

Rayon is prepared in the lab upon reacting wood pulp with some chemicals that are the constituent of the natural silk so it is called artificial silk as it has similar properties as that of natural silk.

(iv) – g

This is the because of the fact that even a nylon thread is said to be stronger than steel wire.

(v) – d

Melamine is the thermosetting plastics. So can withstand high temperature so in case of overheating switch does not change its shape.

(vi) – c

Polythene is the polymer that is made up of large no of monomers which are ethene joined in the linear fashion.

(vii) – a

Bakelite is resistant to heat and is non-conductive in nature so the food remains hot for longer period of time.

Q. 8. Fill in the blanks

i) Synthetic Fibres are also called as _____ Fibres.
ii) Synthetic Fibres are synthesized from a raw material called _____
iii) Like synthetic fiber, plastic also _____
iv) Clothing labels are_____
a) Required by law
b) Identify fabric content
c) Both a and b
d) None of the above
v) Rayon is made of
a) Coal b) Oxygen c) Flax d) Cellulose
vi) A silk fiber's smooth surface absorbs light
a) yes b) no c) can't say

Answer : (i) man-made

Reason: They are prepared in the labs by the humans with the help of chemicals.

(ii) Petrochemicals

Reason: Synthetic Fibres are made up of polymers who are further made up of petrochemicals.

(iii) Polymers

Reason: Polymers are made up of large no of monomers and synthetic Fibres and plastic are both made up of monomers.

(iv) c

Reason: According to the law issued by the government the tag should be there in the cloth that will help identify the texture, size and the fabric content.

(v) d

Reason: Rayon is made from the chemical treatment of wood pulp and cellulose forms the wood pulp.

(vi) b

Reason: Silk surface has very luster due to which it sends back all the rays falling on it.

Q. 9. Where do we use the process of recycling? How is it useful? Give examples.

Answer : Recycling is used in various industries such as :

a) **Paper:** We get paper from the wood by cutting the tree. After the paper is used it is recycled to again get back the paper. This is important otherwise number of trees need to be taken down.

b) **Compost:** The vegetable and fruit peels that are generated in our home is used in making manure that is very productive for the soil.

This is useful as it helps to keep our environment pollution free since the burning of waste leads to air pollution (Incineration) and water pollution (land filling).

Q. 10. Take hair, wool, silk, paper, cotton thread, piece of plastic, thread of sweater, piece of rope and carefully conduct a flame test. Based on smell and type of melting classify them as natural or artificial Fibres.

Answer : Natural Fibres give the smell of burning hair upon burning while artificial Fibres upon heating give the smell of the burning paper.

Similarly, Natural Fibres catch fire very early and melt down very easily and artificial Fibres burn slowly.

Depending upon these test, materials can be classified as follows.

Natural Fibres: Hair, wool, silk, cotton thread, the thread of sweater (wool).

Artificial Fibres: paper, a piece of plastic, the thread of sweater (Synthetic) and a piece of rope.

Q. 11. Prepare a table of various synthetic Fibres which are used to make household articles from them?

Answer :

Synthetic Fibers	Use
PET	Bottles and utensils
Polyester	Fabrics
Plastics	Toys, Bottle caps
nylon	Ropes, tooth brush etc
Rayon	Carpet and bed sheets
Melamine	Electrical switches
Bakelite	kitchenware

Q. 12. Explain the differences between the thermoplastics and thermosetting plastics with

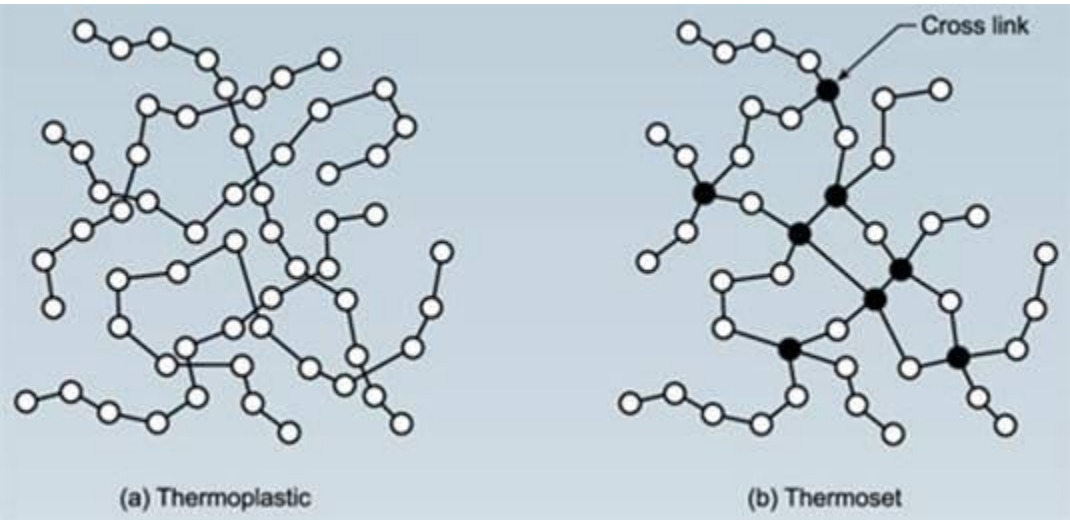
the help of a diagram explaining in terms of arrangements of monomers?

Answer :

Thermoplastics	Thermosetting Plastics
They change their shape upon heating and cooling.	Once formed they do not undergo shape conversion upon heating and cooling
Expensive	Cheap
Recyclable	Not recyclable
The best example is polythene which changes its shape upon heating and cooling.	The best example is the Bakelite which once formed does not change its shape upon further heating.

In thermoplastic, monomers are arranged in linear fashion and there is no linkage (ionic/covalent bond) between different linear chains while in thermosetting, monomers are arranged in such a way that linkage exists between consecutive linear chains. As

we can see in the figure the black one is the point of joining of two different linear chains.



Q. 13. Prepare a chart which can explain recycling codes, full name and acronym of plastic and its usage for the various household article, recycled or not, if recycled what will be made from that?

Answer :

Recycling Code	Acronym	Name	Use	Recyclable	Use after Recycled
1	PET	Polyethylene Terephthalate	Soft drink and beer bottles	Yes	Carpet and furniture
2	HDPE	High-density poly ethylene	Bleach, detergent, shopping bags	Yes	Oil bottles and drainage pipes
3	PVC	Polyvinyl Chloride	Shampoo bottles and packaging	Rarely	Mats, shoes and pipes
4	LDPE	Low-density polyethylene	Shopping and food bags	Rarely. Some shops accept used bags.	Can, number and bags
5	PP	Polypropylene	Lunch box and straw	yes	Brooms and brushes
6	PS	Polystyrene	Hot drink cup and CD cases	Yes	Insulation and packaging
7	Other	Remaining plastic	Bullet proof material and sunglasses	Occasionally	Pipes and plastic timber

Q. 14. Introduction of synthetic Fibres in the textile industry brought revolutionary change across the world in the dressing patterns irrespective of culture and customs. How do you appreciate this?

Answer : Before the advent of new technology that leads to synthetic Fibres , we have limited options such as to wear cotton in summers and wool during winter. However today there is no denying the fact that we have so many fabrics options available that it has completely changed dressing pattern. Synthetic Fibres are cheap, durable and have a good quality of both cotton and wool. So they can be made to have the characteristics of both cotton and wool.

As a result instead of relying on only one option, we have multiple no of options available.

Q. 15. How synthetic Fibres changed our everyday life?

Answer : Synthetic Fibres has brought huge change in our life as it has given more no of options to our wardrobe. Synthetic Fibres are prepared by a scientist who has worked their ass off in order to improve natural fiber so artificial fiber lasts longer as compared to natural fiber as it is resistant to heat, oils from the body and another factor. Also, we can add some dye to it and it can be made stain proof and in this way, it is more durable. For instance

We have a nylon that is used in making carpets, seat belts etc. We have Rayon that is used in making bed sheets etc. Following reasons

Makes it important :

1) Water proof and stain proof

2) Can be carried easily due to less weight

3) They can be of different color and are strong so more durable.

Q. 16. Nibha wants to buy clothes to parents for winter wear. What type of clothes would you suggest? Specify reasons.

Answer : During winter we require the attire that should protect us from the sheer cloth outside by keeping us warm so I would suggest

Clothes made up of wool such as Sweater, shawl, gloves, and socks.

Woolen cloths trap air inside and since air is a bad conductor of heat so it helps to maintain the temperature inside.

Q. 17. If plastic is not properly disposed of, what could be the consequences?

Answer : As plastic is non-biodegradable it can lead to following effects :

a) When we throw plastic onto the road, then animals like cow eat the remaining of the food along with the polythene bag which leads to premature death of animals.

b) Drainage pipes get clogged as a result sewer water overflows that leads to bad smell and breeding center for various mosquitoes.

c) The plastic that finds its way to the water can kill aquatic life.

d) Plastic when burned leads to air pollution as it emits very toxic gases.

Q. 18. Indiscriminate usage of plastic is a serious threat to bio-diversity. What are the efforts of Government and Non-Government organizations in this regard?

Answer : Indeed plastic is the great threat to our surrounding in this regards

1) The government of India framed plastic waste management rules according to which

a) Exporters and producers will have to pay some fees to the government and should register themselves with the government before production.

b) To promote the use of the plastic waste generated in making the roads.

c) To increase the thickness of the plastic from 40 to 50 micron so that the cost will increase and shop owners will not give the bags for free.

NGO'S has taken following steps

a) It organizes various campaigns and aware the public about the various harmful effects of plastics.

b) It gives free Jute bags and encourages people to replace the plastic with jute bags.