

UNIT 3 - POLYMER CHEMISTRY

Class: VII

Subject: Science

I. Choose the correct answers

- The first man-made fibre is _____
a) Nylon b) Polyester **c) Rayon** d) Cotton
- Which of the following is the strongest? _____
a) Rayon **b) Nylon** c) Acrylic d) Polyest
- When you place a natural fibre in a flame it _____
a) melts **b) burns** c) gets nothing d) explodes
- A synthetic fibre which has similar properties to wool is _____
a)Nylon b) Polyester **c) Acrylic** d) PVC
- A good application of plastic is the use of _____
a) Blood bags b) Plastic cutlery
c) Plastic straws d) Plastic carry bag
- _____ is a non-biodegradable material
a)Paper **b)A Plastic bottle** c) Cotton cloth d)Wool
- PET is the acronym for _____
a) Polyester b) Polyester and terylene
c) Polyethylene terephthalate d) Polyetheneterylene

II. Fill in the blanks

- Raincoat is an example of polyester fabric.
- Resin codes are used to identify different types of plastics.
- A polymer is a long chain made up of many repeated small units called monomers.
- A natural fibre is called plant fibre
- A natural fibre obtained by boiling cocoons is called silk

III. True or False

- A lot of plastic pollutes our environment. **True**
- Refuse (avoid) is the best way to manage plastic. **True.**
- It is good to wear clothes made of synthetic fibres while cooking. **False**
- Degradable plastics break down into tiny pieces called microplastics. **True**
- Cotton is a natural polymer. **True**

IV. Match the Following

- Nylon - Fibre

- | | | |
|-------------|---|-----------------------|
| 2. PVC | - | Thermoplastic |
| 3. Bakelite | - | Thermosetting plastic |
| 4. Teflon | - | Non-stick cookwares |
| 5. Rayon | - | Wood pulp |

V. Arrange in Correct Sequence

1. Mix water, starch, vinegar and glycerin in a cooking pot.
2. Let the article cool for 24 hours before we use it.
3. Shape material to form a cup or bowl.
4. Continuously mix on medium heat until the liquid turns clear.
5. When the liquid begins to bubble it is ready to be taken off the stove.
6. Spread the gel onto aluminium foil and cool.

Answer:

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VI. Analogy

1. Cotton: natural : Polyester: Synthetic
2. PLA spoon : compostable : Plastic spoon : Disposable.
3. Nylon :melts on heating : Silk: Burns on heating.

VII. Assertion and Reason

1. A: Vegetable peels buried in the soil disappear within two weeks.
R: Vegetable peels are compostable.
(a) Both A and R are true and R is the correct explanation of A
2. A: It takes a very long time for nylon clothes to breakdown into microfibers but cotton clothes need only six months to decompose.
R: Nylon made out of petrochemicals is non-biodegradable and cotton cloth is biodegradable.
(a) Both A and R are true and R is the correct explanation of A
3. A: It is good to avoid plastics.
R: Plastics end up polluting the environment.
(a) Both A and R are true and R is the correct explanation of A

VIII. Crossword

Across:

1. Fibre that is used as synthetic wool. Acrylic
2. A plastic used for making water bottles. Polythene
3. A long chain made of small repeating monomers. Polymer
4. Another name for this semi-synthetic fibre is artificial silk. Rayon

Down:

5. A type of fibre that is naturally obtained from a cocoon. Silky
6. A synthetic fibre classified as polyester. Terycot
7. A polymer used for making rope. Nylon

IX. Very Short Answer

1. What is the chemical name of the polymers that make up cotton?

Cellulose.

2. What gives plastic different qualities and characteristics?

Different chemicals (additives) are added to plastic to give them various qualities and characteristics.

3. It is not advisable to burn plastic and synthetic fabrics. Why?

Burning of plastics and synthetic fabrics is not a good solution, as we end up wasting non-renewable resources and produce super toxic chemicals that are difficult to store or dispose safely.

4. A bucket made of plastic does not rust like a bucket made of iron.

Why?

- The reason is due to their chemical composition.
- The bucket is made of plastic which does not react with the oxygen and humidity present in air.
- While the iron reacts with the oxygen, air corrodes to form rust.

5. Why is it better to avoid the use of plastic products?

- Plastics do not decompose by natural processes and action of bacteria and are therefore not biodegradable.
- A lot of the plastic produced globally is designed to be used only once and thrown away, creating a large amount of plastic waste.
- Plastic waste ends up being recycled, incinerated, landfilled, dumped or ends up littering our environment.
- So, it is better to avoid the use of plastic products.

6. Give two examples of thermosetting plastics.

Bakelite, Melamine.

7. What is the 5 R principle?

Plastic disposal is the 5 R principle, Refuse, Reduce, Reuse, Recycle and Recover is called as 5 R principle.

X. Short Answer

1. What does the term biodegradable mean?

- Organic waste such as the peels of vegetables, fruits and food remains can get broken down by bacteria in the soil to create a rich source of nutrients in the form of compost.
- A material that gets decomposed through natural processes and action by bacteria is called biodegradable.

2. What kind of fabric is suitable to dress-up and play in the summer?

- In summer it is better to wear clothing that is made out of cotton materials rather than synthetic.
- This is because most synthetic fibres absorb very little moisture and do not allow air circulation making them hot and uncomfortable to wear.

3. How do plastics impact animals and the environment?

- The increase in the use of plastics, particularly the one-time use and throw away plastics has serious impacts on the environment, animals and our health.
- We have seen garbage dumps with different plastics. One big problem with plastics is that they do not decompose or biodegrade.
- This leads to large amounts of waste that will not disappear and end up accumulating and polluting the environment.
- Many animals confuse plastic for food and eat it by accident. When leftover food is thrown away it is often packed in plastic. Animals smell the leftover food and eat the plastic by accident. For example animals in urban areas, particularly cows, often eat polythene plastic bags by accident as they contain food waste.

XI. Long Answer

1. List the advantages and disadvantages of synthetic fibres.

S.No	Advantages of synthetic fibres	Disadvantages of synthetic fibres
1	Do not wrinkle easily and they keep their colour and	Synthetic fibres such as polyester is that they are not heat resistant and catch fire

	brightness for a much longer time than natural fibres such as cotton.	easily.
2	Using synthetic fibres such as nylon, is that they are stronger than many natural fibres such as silk or wool.	Most synthetic fibres absorb very little moisture and do not allow air circulation making them hot and uncomfortable to wear.
3	These fibres are strong and elastic which gives it the properties to bounce.	Synthetic fibres are made out of petrochemicals and last in the environment for a very long time. It break down into very small pieces called microplastics which cause pollution to soil and water bodies such as rivers, lakes and oceans.

2. Suggest safe methods of disposing plastics.

Refuse (Avoid):

- The best thing to do is to avoid using plastic products.
- One-time use throw away plastics can often be avoided.
- Reduce : Reducing the amount of plastic we use is important.
- Reuse : If possible products made of plastics can be used again and again.

Recycle:

- It is better to recycle plastic waste.
- Separating plastic waste (based on the resin code) and making sure it gets recycled is good as it turns waste materials into something new.
- Then it will not be thrown away in landfills, open dumps or ending up as litter in the environment.

Solid waste can be converted into resources such as electricity and compost through thermal and biological means.

XII. HOT's

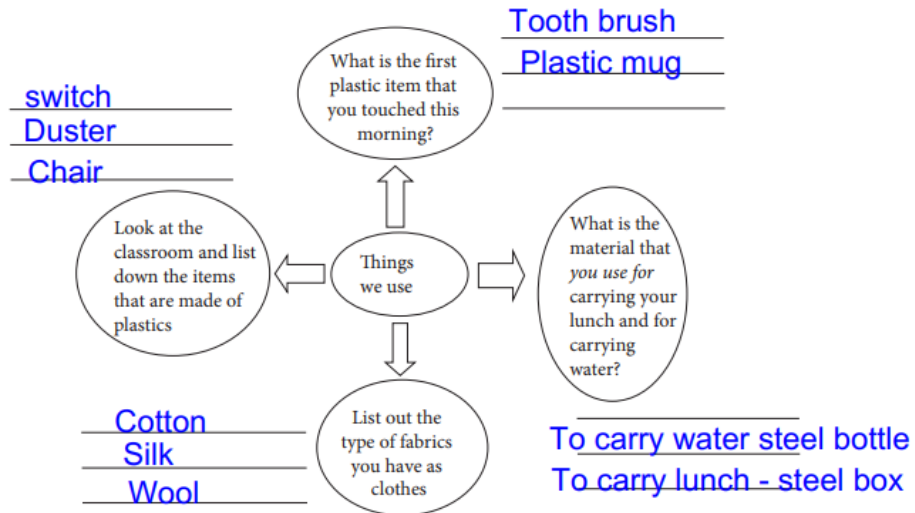
1. The Tamil Nadu Government has banned the use of one-time use throwaway plastics. Why do you think this is important?

It is important to reduce the negative consequences of plastics on the environment.

2. A plastic bag dumped in the soil stays without breaking down for 500 years. If a new generation starts in every 30 years, how many generations would it take to see the plastic bag finally broken down?

It would take 16 to 17 generations to see the plastic bag finally broken down.

XIII. i) Fill in the blanks.



2. Look at the following picture and explain what is happening.

- A lot of one-time use plastic such as polythene bags and food packaging that are thrown away are responsible for littering the environment and clogging drains.
- Standing water breeds mosquitoes that can spread diseases such as malaria dengue and chickungunya and also lead to flooding.



iii) Read the following information and convert them into a graph to compare the countries and the amount of plastic they use.

China contributes the highest share - that is around 28%, of the total plastic used globally. Indonesia uses 10%, both the Philippines and Vietnam use 6% each; Thailand uses 3.2%, Egypt 3%, Nigeria 2.7% and South Africa 2%

