

7th Science Lesson 14 Questions in English

14] Polymer Chemistry

1. Which of these make the fibers?

- a) **Polymers**
- b) Proteins
- c) Fatty Acids
- d) Nucleus

Explanation

Fibers are made up of long chains of natural or synthetic polymers.

2. What is the origin of the word Polymer?

- a) Latin
- b) French
- c) **Greek**
- d) Roman

Explanation

The word 'Polymer' is of Greek origin. 'Poly' means many and 'mer' means basic smaller unit.

3. Define polymerization.

- a) **Monomers are joined together by covalent bonds to form a polymer.**
- b) Classification of natural polymers.
- c) Recycling process of polymers.
- d) Chemical reactions used to form the monomers.

Explanation

Polymers are very long chains made of repeating smaller molecules called 'monomers' that are joined together by covalent bonds and the process is called polymerization.

4. Which of these is a common plastic?

- a) **Polyvinyl Chloride**
- b) Thermocol
- c) Polycarbonate
- d) Acrylic

Explanation

Polyvinyl Chloride (PVC) is a common plastic used for water pipes. The monomer and polymers of PVC is shown below.

5. Which of this polymer is mostly used in daily life?

- a) Natural polymers
- b) Resin
- c) Synthetic polymers**
- d) Monomers

Explanation

Polymers can be classified into natural and synthetic polymers. The most familiar polymers that we use in our daily life are man-made and synthetic.

6. Which of the following is not a natural polymer?

- a) Cellulose
- b) Carbohydrates
- c) Starch**
- d) Proteins

Explanation

Natural polymers are found in living systems that include proteins and carbohydrates in our bodies and cellulose in wood and paper. They play a very important role in living things to provide structural materials and molecules needed for life processes.

7. Which of these is the basis of protein polymers?

- a) Starch
- b) Fatty oils
- c) Amino acid Monomers**
- d) Cellulose

Explanation

Protein polymers are made from amino acid monomers (20 different kinds of amino acids). Different combinations of the amino acid monomers create many different protein polymers. Examples of protein polymers include DNA, enzymes, silk, skin, hair, fingernails, feathers and fur.

8. What are the carbohydrate polymers?

- a) Lignin
- b) Chitin
- c) Cellulose
- d) All the above**

Explanation

Examples of carbohydrate polymers include cellulose, chitin and lignin found in plants. Cellulose is made of sugar molecules and is the main component of cotton used in clothing.

9. Which of this polymer give structure to plants?

- a) Chitin
- b) Lignin**
- c) Protein
- d) Amino Acid

Explanation

Chitin is found in the cell walls of fungi such as mushrooms and exoskeletons of insects such as crabs and spiders. Lignin consists of a network of polymers and is important in giving structure to plants.

10. Which of this is the byproduct of petrol?

- a) Ethylene**
- b) Plastics
- c) Resin
- d) Amino acids

Explanation

Synthetic polymers are man-made polymers produced by using raw materials from petroleum oil and gas. Plastics are synthetic polymers. When oils and gases are processed to make petrol, ethylene and propylene monomers are removed as byproducts.

11. What are the building blocks of various polymers?

- a) Acetylene
- b) Propene
- c) Ethylene**
- d) Methane

Explanation

The Poly Vinyl Chloride (PVC) is made up of many monomers joined together. Ethylene and propylene are the building block monomers that make up many different types of plastics.

12. Which of these factors decide the categories of the polymers?

- a) Arrangement
- b) Nature of the monomers
- c) Characteristics of final polymer

d) All the above

Explanation

Based on the nature of the monomers the way they are arranged in the polymer and the characteristics of final polymer. There are grouped into different categories such as fibres, plastics, proteins.

13. Assertion (A): All the natural and synthetic fibers are called as polymers.

Reasoning(R): Cotton and Wool are the natural fibers used in daily life.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

We wear clothes, use bags, rope, blankets, etc. in our daily life. They are made of fibres. Once upon a time, people used natural fibres such as cotton and wool. Nowadays, we use a lot of synthetic fibres. All natural and synthetic fibres are polymers.

14. Which is not a natural fiber?

a) Cotton

b) Wool

c) Rubber

d) Silk

Explanation

Fibres are long strands of polymers interwoven to form linear, string-like structures. Fibres that are obtained from plant or animal sources are called natural fibres. Examples include cotton, coconut fibre, hair, wool and silk.

15. Which of the following are synthetic fibers?

a) Polyester

b) Acrylic

c) Nylon

d) All the above

Explanation

Fibres that are made using raw materials from petroleum are synthetic fibres. Examples include polyester, acrylic and nylon.

16. Assertion (A): The natural fibers are used for clothing, insulating materials and containers.

Reasoning(R): All the natural fibers can be knitted, woven and bonded.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

A large variety of natural fibres are still grown and processed such as cotton, silk, and wool. Natural fibres can be spun into filament, thread or rope. Then they can be woven, knitted, matted or bonded and are used to make clothing, containers, insulation material and many other products we use in our daily life.

17. Choose the correct statements.

- i) Synthetic fibers are the byproducts of petro chemical products.
 - ii) Nylon, Polyester and acrylics are some of the synthetic fibers.
 - iii) Synthetic fibers are used in tooth brushes, blankets and clothing.
- a) i only
 - b) ii only
 - c) iii only
 - d) All the above

Explanation

The discovery of making synthetic fibres out of petrochemicals has replaced the use of many natural fibres. Synthetic fibres such as nylon, polyester and acrylic are used to make many different plastic items you use in your daily life such as clothing, blankets, tooth brushes and stuffing in cushions.

18. What are the types of natural silk?

- a) Mulberry silk
- b) Muga silk
- c) Eri silk
- d) All the above

Explanation

Natural silk fibres are obtained from boiling the cocoons of silk worms from specific species of moths. There are four types of natural silk: Mulberry silk, Tasar silk, Muga silk and Eri silk.

19. Which of these silk is mostly produced in India?

a) Mulberry silk

- b) Muga silk
- c) Eri silk
- d) Tasar silk

Explanation

Most of the mulberry silk worldwide is produced in India. Silk is one of the strongest natural fibres and has many uses such as clothing, carpets and parachutes.

20. In which of these places the first rayon factory was established in India?

- a) Mumbai
- b) Goa
- c) Kerala**
- d) Vishakhapatnam

Explanation

In the 19th century scientists were successful in producing the first artificial silk known as rayon. The first rayon factory in India was established in Kerala in 1946.

21. Assertion (A): Rayon is a complete man-made synthetic fiber.

Reasoning(R): The Natural pulp collected from wood and bamboo are used in rayon making.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is False but R is True.**
- d) Both A and R is False.

Explanation

Rayon is a man-made fibre but it is not considered fully synthetic as it is made out of natural cellulose collected from wood pulp. The cellulose that is collected from wood or bamboo pulp is treated with several chemicals.

22. Which of these are not involved in rayon production?

- a) Viscose
- b) Sodium hydroxide
- c) Sodium chloride**
- d) Carbon disulphide

Explanation

First sodium hydroxide is added to the natural wood pulp followed by carbon disulphide. The cellulose dissolves in the chemicals added to it and produces syrup called Viscose. Viscose is

forced through a spinneret (a device made of metal plates with very tiny holes) into a solution of dilute Sulphuric acid. This produces silk-like threads that are cleaned with soap and dried. This new fibre is called rayon.

23. Choose the correct statements.

i) Rayon can be woven like natural silk fibers.

ii) Rayon is mixed with cotton or wool.

a) i only

b) ii only

c) Both i and ii

d) Neither i nor ii

Explanation

Rayon is cheaper than silk can be woven like natural silk fibre and can be dyed in a wide variety of colors. It can be mixed with cotton to make bed sheets or with wool in the production of carpets and home furnishing products. Rayon is also found in sanitary products, diapers, bandages and gauze for dressing wounds.

24. Assertion (A): Nylon is the first fully processed synthetic fiber.

Reasoning(R): Nylon is the most common synthetic fiber.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Nylon is the first fully processed synthetic fibre. It was popular during the Second World War for the use of parachutes and rope materials for climbing. Nowadays, nylon has replaced natural silk in many textiles, and has become one of the most commonly used synthetic fibres.

25. Which of these are the characteristics of nylon?

a) Elastic and light

b) Strong

c) Lustrous

d) All the above

Explanation

Nylon fibre is strong, elastic and light. It is lustrous and easy to wash, which has made it popular for the clothing industry. We use many products made from nylon such as socks, ropes, tents, toothbrushes, car seatbelts, sleeping bags, curtains etc.

26. Which of these is the basic component of nylon?

- a) **Polyamides**
- b) Polypropone
- c) Acetyl acid
- d) Tin

Explanation

Nylon is a plastic polymer made of chemical units called polyamides. Polyamides are made with monomers –hexa methylene di-amine and adipic acid. Solid chips of these polyamides are melted and forced through a heated spinneret which has very, very tiny holes.

27. What are the other names of polyester?

- a) Polycot
- b) Polywool
- c) Terrycot
- d) **All the above**

Explanation

Polyester is another synthetic fibre. It can be drawn into very fine fibres that can be woven like any other yarn. Polyester is sold in the name of polycot, polywool and terrycot etc.

28. Which of these components provide the polycot material?

- a) **Polyester and cotton**
- b) Polyester and wool
- c) Polythene and cotton
- d) Polythene and wool

Explanation

Polycot is a mixture of polyester and cotton; Polywool is a mixture of polyester and wool. PET (Polyethylene Terephthalate) is a very familiar form of polyester. It is used for making water and soda bottles, utensils, films and wires amongst many other useful products.

29. Which of these features of polyester used in cloth making?

- a) Wrinkle free
- b) Easy to wash

c) Suitable for dress materials

d) All the above

Explanation

Many of the clothes we wear are made out of polyester fibres. Fabrics made from this fibre do not get wrinkled easily and are easy to wash making polyester fabrics suitable for dress materials.

30. Choose the incorrect statements.

i) Acrylic made clothes are less expensive.

ii) Acrylic polymers are available in white color only.

iii) Synthetic fibers are durable and affordable.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

The wool obtained from natural sources is quite expensive whereas clothes made from acrylic are relatively cheap because they are a byproduct of the production of plastics. They are available in a variety of colors. Synthetic fibres are more durable and affordable which has contributed to their widespread use.

31. Which of this fiber can hold their color and brightness for longer time?

a) Wool

b) Cotton

c) Polyester

d) Rayon

Explanation

Synthetic fibres such as polyester and the advantages are that they do not wrinkle easily and they keep their color and brightness for a much longer time than natural fibres such as cotton.

32. What is the main advantage of using the synthetic fibers?

a) Stronger than natural fibers.

b) Easily reusable.

c) Cost of manufacturing is low.

d) Cheaper than natural fibers.

Explanation

A lot of materials such as fishing nets are made from synthetic fibres. One of the main advantages of using synthetic fibres such as nylon is that they are stronger than many natural fibres such as silk or wool. For example a trampoline is made of woven synthetic fibres. These fibres are strong and elastic which gives it the properties to bounce.

33. List out the drawbacks of the synthetic fibers.

- a) Absorbs low moisture.
- b) Not heat or fire resistant.
- c) Does not allow air circulation
- d) All the above**

Explanation

Drawbacks of Synthetic Fibres: This is because one disadvantage of synthetic fibres such as polyester is that they are not heat resistant and catch fire easily. 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. The disadvantage is that they break down into very small pieces called micro-plastics which cause pollution to soil and water bodies such as rivers, lakes and oceans.

34. In which of the fields plastics are used to make advancements?

- a) Food safety
- b) Healthcare
- c) Transport
- d) All the above**

Explanation

Plastics have helped us to make advancements in technology, building, healthcare, transport and food safety. Plastics have completely occupied our life because of their characteristic qualities.

35. What are the features of plastics?

- a) Lightweight
- b) Complex shapes
- c) Waterproof
- d) All the above**

Explanation

Plastics have many positive qualities such as lightweight, strong and they can be molded into complex shapes. They are also flexible and waterproof and some plastics are even UV resistant. Plastics are also cheap and convenient for us to use.

36. Who was the creator of the first plastic Parkesine?

a) **Edmund Alexander Parkes**

b) Alexander Fleming

c) Lavoisier

d) Robert Boyle

Explanation

Plastic has been around for less than 200 years. Edmund Alexander Parkes was the creator of the first plastic called 'Parkesine'.

37. Assertion (A): All the plastics have the same type of arrangement of units.

Reasoning(R): The monomers are arranged in linear manner for all types of plastics.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) **Both A and R is False.**

Explanation

The plastics we use in our daily life are also made up of polymers. All plastics do not have the same type of arrangement of units. In some articles, the arrangement of a monomer is linear, and in some other items, the arrangement of articles is cross-linked.

38. How many types of plastics are categorized based on the arrangement of monomers?

a) 4

b) **2**

c) 3

d) 5

Explanation

Depending on the type of arrangement, we have two main types of polymers – thermoplastics and thermoset.

39. Which is an example of thermoplastics material?

a) **Polyethylene**

b) Acrylic

c) Thermocol

d) Bio-plastics

Explanation

Thermoplastics: Polyethylene (also called polythene) is an example of a plastic. It is used for making polythene carry bags which are commonly used. When you burn a polythene carry bag, it melts and turns into liquid along with the production of an offensive odor a bright flame and soot.

40. Assertion (A): Polyethylene terephthalate is an example for thermoplastics.

Reasoning(R): Thermoplastics can be modified and turned into another plastic item.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Another example is a PET (Polyethylene Terephthalate) bottle, when we fill it with boiling water, it gets deformed. Plastics which can be easily softened and bent when heated are known as thermoplastics. These plastics can be modified and turned into another plastic item through the process of recycling.

41. Which of these are the properties of thermoset plastics?

- a) Remains hard when heated.
- b) Easily molded when heated.
- c) Tangled polymer chains.
- d) Weak attraction force.

Explanation

Thermoset: On the other hand, there are some plastics, which once they are molded cannot be softened through heating them. These are called thermosetting plastics.

42. Which of these are used to make electrical switches?

- a) Bakelite
- b) Aluminium
- c) Nylon
- d) Thermocol

Explanation

Bakelite and melamine are some examples of thermosetting plastics. Bakelite is a poor conductor of heat and electricity. It is used for making electrical switches and handles of various utensils.

43. What is the usage of melamine?

- a) Pipes

b) Fire and heat resistant tiles and fabrics

c) Bullet proof materials

d) Toys

Explanation

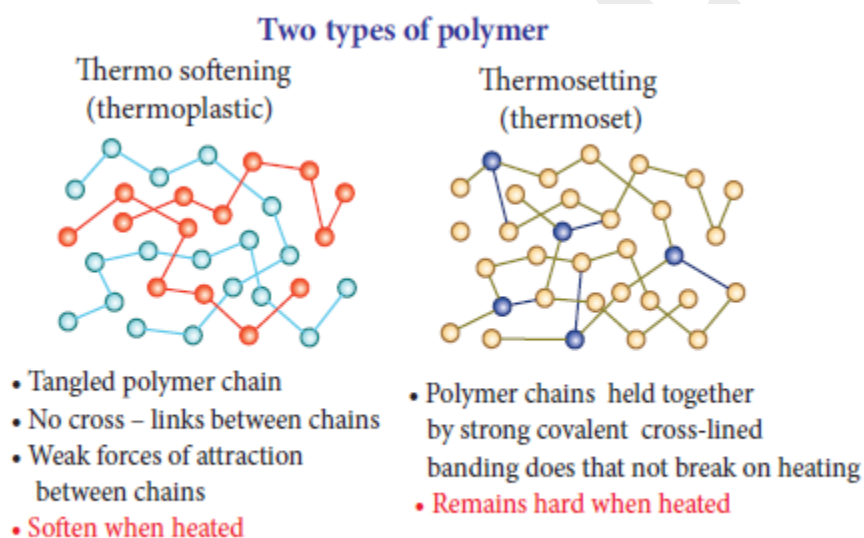
Melamine resists fire and can tolerate heat. It is used for making floor tiles and fabrics that resist fire.

44. What are the properties of thermoplastic?

a) Weak force of attraction

b) Tangled polymer chain

c) Soften when heated

d) All the above**Explanation**

45. What are the uses of the resin codes?

a) Categorizing types of plastics

b) For recycling purpose

c) Identify various plastics

d) All the above**Explanation**

The resin codes are a universal way of categorizing different types of plastic, which helps us separate plastics so that it is easier to recycle them.

46. Which of these harmful materials are present in the polyvinyl chloride?

- a) Cadmium
- b) Lead
- c) Tin
- d) Both a and b

Explanation

Polyvinyl Chloride- PVC resin code#3 has heavy metals such as cadmium and lead which are toxic chemical which are harmful to your health.

47. Which of these plastic is designed to for single purpose usage?

- a) PETE
- b) PEHD
- c) HIPS
- d) LLDPE

Explanation**PLASTIC RESIN CODE CHART**

RESIN CODE	OTHER NAMES	COMMON ITEMS	ABOUT
	PETE, Polyester	Umbrella, sports clothing, warm fleece jackets/sweaters, rope, sails, polyester fibre made into sleeping bags.	This plastic is designed to be used only ONCE. Reusing PET plastic can release a chemical called antimony which is not good for your health. Polyester is the most widely used synthetic fibre for clothes.

48. Which of these products are made by PEHD material?

- a) Bullet proof materials
- b) Ropes
- c) Rice and cement sacks
- d) All the above

Explanation

	PEHD	Cement/rice/cow food sacks, crocheted/woven tiffin bags, rope, fishing nets, shade nets/structures, fibre reinforced concrete (taken from plastic cans), bulletproof material- vests (Ultrahigh Molecular Weight Polyethylene- UHMW).	Considered one of the safer plastics. It is light, very strong and has excellent impact strength. It is an effective moisture barrier. It is widely recycled.
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49. Which of the following material has good resistance to fire and weathering?

- a) PELD

- b) Vinyl
c) Thermocol
d) Polycarbonate

Explanation

	V, Vinyl	PVC fibres/Vinyon fibres are used to make shower curtains, outdoor fabrics, raincoats, boots, fishing nets, synthetic yarns, children's clothing & blankets. Vinyl is used for stickers on clothing, dress costumes and fake leather.	The most toxic plastic. Vinyon has good resistance to weathering and fire.
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50. Which of these plastic is flexible but strong material?

- a) Vinyl
b) PELD
c) XPS
d) Nylon

Explanation

	PELD, LLDPE	Heavy-duty sacks, artificial grass/turf for football.	Considered one of the safer plastics. It is very flexible and soft but strong.
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51. Identify the incorrect Match.

- | | |
|------------------|----------------------|
| A. Nylon | i) Clothes |
| B. Acrylic | ii) Helmets |
| C. Polycarbonate | iii) Food containers |
| D. Polyurethane | iv) Foam |

- a) i only
b) ii only
c) iii only
d) iv only

Explanation

	Polycarbonate (PC), acrylonitrile butadiene styrene (ABS), acrylic (AC), bioplastics, nylon, polyurethane (PU), etc.	PC: baby bottles & food containers. ABS: helmets & car bumpers. Acrylic: fibre optical cables & paints. Bioplastics: plastic bags & tableware. Nylon: clothes, kites & toothbrush bristles. PU: mattress foam & shoe soles.	This code includes all plastic types that do not fit into the resin codes 1- 6. PC and ABS are two of the unsafe plastics and are considered toxic. When you see a #7 plastic try to know more before buying and using it.
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52. Which of the Resin code plastics are considered as the toxic plastics?

- a) 05
- b) 02
- c) 04
- d) 06

Explanation

RESIN CODE	OTHER NAMES	COMMON ITEMS	ABOUT
	PETE, Polyester	Umbrella, sports clothing, warm fleece jackets/sweaters, rope, sails, polyester fibre made into sleeping bags.	This plastic is designed to be used only ONCE. Reusing PET plastic can release a chemical called antimony which is not good for your health. Polyester is the most widely used synthetic fibre for clothes. 
	PEHD	Cement/rice/cow food sacks, crocheted/woven tiffin bags, rope, fishing nets, shade nets/structures, fibre reinforced concrete (taken from plastic cans), bulletproof material-vests (Ultrahigh Molecular Weight Polyethylene- UHMW).	Considered one of the safer plastics. It is light, very strong and has excellent impact strength. It is an effective moisture barrier. It is widely recycled. 
	V, Vinyl	PVC fibres/Vinyon fibres are used to make shower curtains, outdoor fabrics, raincoats, boots, fishing nets, synthetic yarns, children's clothing & blankets. Vinyl is used for stickers on clothing, dress costumes and fake leather.	The most toxic plastic. Vinyon has good resistance to weathering and fire. 
	PELD, LLDPE	Heavy-duty sacks, artificial grass/turf for football.	Considered one of the safer plastics. It is very flexible and soft but strong. 
		Disposable absorbent articles-diapers, wet wipes for cleaning. Ropes, carpets, clothing, for filtration, battery separators & geotextiles (drainage and erosion control). PP micro-fibers are added to concrete to stabilise the mix.	Considered one of the safer plastics. Nonwoven PP fabrics are made so that they can be used in disposable products that you usually throw away after one use. 
	Thermocol, EPS XPS and HIPS	Pens, rulers, throwaway tea & juice cups, plates and cutlery and toys.	One of the unsafe plastics as it has toxic chemicals. Most PS in the world is made for one-time use/throwaway food and drink packaging. 
	Polycarbonate (PC), acrylonitrile butadiene styrene (ABS), acrylic (AC), bioplastics, nylon, polyurethane (PU), etc.	PC: baby bottles & food containers. ABS: helmets & car bumpers. Acrylic: fibre optical cables & paints. Bioplastics: plastic bags & tableware. Nylon: clothes, kites & toothbrush bristles. PU: mattress foam & shoe soles.	This code includes all plastic types that do not fit into the resin codes 1-6. PC and ABS are two of the unsafe plastics and are considered toxic. When you see a #7 plastic try to know more before buying and using it. 

53. Which of these are not related to the plastics with no code?

- a) It can be any plastic item.
- b) The manufacturer did not follow the rules for this type.
- c) It could be harmful.
- d) It can be used with limitation.**

Explanation

NO CODE	Does not have resin code or an acronym	Can be any plastic item.	The company did not follow the rules and mark what type of plastic was used. It could be harmful but you do not have the information to know for sure. Avoid using plastic without a resin code.
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54. Which of these house hold products contain the micro beads that cause pollution?

- a) Tooth paste
- b) Face wash
- c) Body scrubs
- d) All the above**

Explanation

Some micro plastics are also found in household products. Examples are micro beads that can be found in toothpaste, face wash and body scrubs. Micro beads are washed down in drains and end up in the soil , rivers, lakes and the ocean Micro beads are washed down in drains and end up in the soil, rivers, lakes which cause pollution.

55. When did the Government of Tamilnadu ban the usage of one-time plastics?

- a) 2019**
- b) 2017
- c) 2009
- d) 2016

Explanation

The Government of Tamil Nadu has banned one-time use and throws away plastics such as plastic carry bags, plates, straws and water pouches. This is an indication that important efforts are taking place to reduce negative consequences of plastics on the environment.

56. Which of these are the dangerous pollutions in the Ocean?

- a) Poly peptide pollutants
- b) Poly methylene
- c) Persistent Organic pollutants**
- d) Poly propane products

Explanation

Dangerous pollution called Persistent Organic Pollutants (POPs) floating in the ocean sticks to these small pieces of plastic making them toxic. Marine animals such as shrimp and fish often eat micro plastics, confusing them for their natural source of food. The toxins build up in these animals and move up the food chain and can end up in our bodies. Micro plastics can be found in the food we eat, the water we drink, and the air we breathe.

57. Which of the plant starch are substitute for some plastics?

a) Poly Lactic Acid

- b) Cellulose
- c) Starch
- d) None of the above

Explanation

Poly Lactic Acid (PLA) a substitute for some types of plastics. Poly Lactic Acid or poly lactide is compostable and bioactive thermoplastic. This polymer is obtained from plant starch such as corn, sugarcane and pulp from sugar beets. PLA is a biodegradable material. It is useful for making food packaging, garbage bags and disposable table ware.

58. What are the disposal methods for the plastic products?

- a) Recycle
- b) Incinerate
- c) Landfill
- d) All the above**

Explanation

Plastic waste ends up being recycled, incinerated, landfilled, dumped or ends up littering our environment.

59. Which of the disposal method is least followed globally in plastic disposals?

- a) Landfills
- b) Incineration
- c) Recycle**
- d) Littering

Explanation

It is estimated that from all the plastic waste ever produced, 79% is in landfills, dumps or in the environment 12% has been incinerated and only a small 9% is recycled.

60. What is the 5R principle used for plastic disposal?

- a) Reuse, Replace, Rebuild, Recycle and Recover.
- b) Reduce, Replace, Reproduce, Reimburse, Recover.
- c) Refuse, Reduce, Reuse, Recycle, Recover.**
- d) Recommend, Resend, Reuse, Recollect, Recover.

Explanation

One way to look at plastic disposal is the 5R Principle – Refuse, Reduce, Reuse, Recycle and Recover. We have already learned about the waste pyramid and how the different methods of waste disposal can be seen in terms of the best option to the least favorable in this order: Refuse (Avoid), Reduce, Reuse, Recycle, Recover (Compost and Incinerate) and Landfill.

61. Define Down-cycling of plastics.

- a) Every time plastic is melted and recycled loses its quality.**
- b) Recycling the used plastics with new technologies.
- c) Landfilling the used plastics.
- d) Degradation of plastics.

Explanation

Recycling of plastics is challenging and it is important to know that plastics cannot be recycled forever. There are so many different types of plastics, which are often mixed together making it difficult to separate them back into the original material. Every time plastic is melted and recycled it loses quality this is called 'Down-cycling'. Recycling of plastic waste cannot be the only solution to plastic pollution.

62. Which of these energy sources are derived from the solid wastes?

- a) Thermal energy**
- b) Wind energy
- c) Solar energy
- d) Hydro power

Explanation

Solid waste can be converted into resources such as electricity and compost through thermal and biological means. Burning plastics in a large furnace or in the open is bad for the environment.

63. Choose the correct statements.

- i) Toxic pollutants are released by open burning of plastics.
 - ii) Incinerator burning of plastics is used to produce energy.
- a) i only

- b) ii only
- c) Both i and ii
- d) Neither i nor ii

Explanation

Open burning of plastics releases toxic pollutants into the air and soil, which are harmful to our health animals and the environment. Burning plastics at high temperatures in incinerators and trapping the gases and collecting the toxic ash are widely used to produce energy. This is often seen as a positive way to deal with plastic waste.

64. Assertion (A): Plastics in landfills is the most common way for disposing the plastics.

Reasoning(R): Landfills of plastics can lead to air, soil and ground water pollution.

- a) Both A and R is True and R is the correct explanation of A.
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Plastic waste often ends up in landfills that are huge holes where waste is buried to keep it separate from the environment. This is the most common way for plastics to be disposed of around the world. Plastics make up 7-13% of waste that is sent to landfills on a global scale. Plastics in landfills can still lead to pollution of the air, soil and groundwater. Over time landfills can degrade, and the toxic chemicals in certain plastics can leak out into the environment.

65. On what basis plastics are classified into degradable and compostable plastics?

- a) Nature of degradation
- b) Sources
- c) Chemical process
- d) Physical Characteristics

Explanation

The concept of biodegradable plastics or bio-plastics was first introduced in the 1980s. Based on the nature of degradation, there are two main types of plastics: degradable plastic and compostable plastic.

66. Choose the Incorrect statements regarding the degradable plastics.

- i) Degradable plastics are made from petroleum oil.
- ii) Chemical additives are added for faster breakdown than conventional plastics.
- iii) Degradable plastics are broke down when exposed to oxygen, water and sunlight.

- a) i only
- b) ii only
- c) iii only
- d) None of the above**

Explanation

Degradable plastics are made from petroleum oil or gas which is the same as conventional plastics. The difference is that they have a chemical or additive added to them to make them breakdown faster than conventional plastics when they are exposed to sunlight, oxygen or water.

67. Assertion (A): Degradable plastics are broken down into micro-plastics.

Reasoning(R): The degradable plastics do not break down completely in the environment.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Degradable plastics breakdown into tiny pieces called micro-plastics and these stay in our environment for a very long time. It is very important to understand that degradable plastics do not breakdown completely in the environment. Scientists have found that micro-plastics in the ocean are really bad and it is likely that these tiny pieces in the soil are also harmful.

68. What are the known sources of the compostable plastics?

- a) Sugar cane
- b) Shrimp shells
- c) Avocado seeds
- d) All the above**

Explanation

Compostable plastics are derived from renewable resources such as corn, sugar cane, avocado seeds or shrimp shells.

69. Assertion (A): Compostable plastics are completely broken down by microbes.

Reasoning (R): The broken compostable plastics are turned into carbon-di-oxide, methane and water.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.

d) Both A and R is False.

Explanation

Compostable plastics can be broken down completely by microbes and turned back into food for plants carbon dioxide, methane, water and other natural compounds.

70. Which of these plastics could be digested by the Ideonellasakaiens bacteria?

a) Polyester

b) Polycarbonate

c) Polyethylene Terephthalate

d) Polyurethane

Explanation

In 2016, scientists from Japan tested different bacteria from a bottle recycling plant and found that Ideonellasakaiens is 201-F6 could digest the plastic used to make single-use drinks bottles that are made of polyethylene terephthalate (PET).

71. Name the enzyme that breaks down plastic into smaller molecules?

a) PETase

b) Petx

c) PITE

d) Ps

Explanation

The Ideonellasakaiens bacteria works by secreting an enzyme known as 'PETase', that breaks down plastic into smaller molecules. These smaller molecules are then absorbed by the bacteria as a food source.

72. Assertion (A): Glass is the most oldest and versatile man-made material.

Reasoning(R): Glass retains its quality even after recycling many times.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Glass is one of the world's oldest and most versatile human created materials. Glass is the only material that can be recycled over and over again without losing its quality.

73. Which of the following is not true regarding the qualities of glass?

- a) Made from opaque sand.
- b) It is partially transparent.**
- c) Similar to solid material.
- d) It is also available in liquid form.

Explanation

Glass is bit of a riddle. It is hard enough to protect as but it shatters with incredible ease. It is made from opaque sand, yet, it is completely transparent. Most surprisingly, it behaves like a solid material, but it is also a sort of weird liquid in disguise.

74. Which of these is added with the silicon-di-oxide prior to the cooling process?

- a) Lead
- b) Chromium
- c) Sodium Carbonate**
- d) Iron oxide

Explanation

Glass is prepared by heating (SiO_2) silicon-di-oxide until it melts, say to about 1700°C and Sodium Carbonate is added to it. Then it is cooled down really fast. When SiO_2 silicon-di-oxide melts, the silicon and oxygen atoms break out of their crystal structure. If we cooled it slowly, the atoms would slowly line up back into their crystalline arrangement.

75. In which of the stage glass is considered as polymers?

- a) Cooling stage**
- b) High temperature region
- c) Molten state
- d) None of the above

Explanation

Materials like glass are called as amorphous. At the cooling stage glass is linear in arrangement inorganic in nature and has a structure very similar to glass and they are considered as polymers.

76. Which of these are used in a commercial glass plant?

- a) Soda ash
- b) Limestone
- c) Used glass
- d) All the above**

Explanation

In a commercial glass plant, sand is mixed with waste glass (obtained from recycling collections), soda ash (sodium carbonate) and limestone (calcium carbonate) and heated in a furnace.

77. What is the purpose of adding soda ash in the making of commercial glass?

- a) Increase the melting capacity
- b) Dissolving capacity
- c) Reduce the melting point of sand**
- d) Reduce the temperature

Explanation

The soda ash reduces the sand's melting point and produces a kind of glass that would dissolve in water. The limestone is added to stop that happening. The end product is called soda-lime-silica glass. It is the ordinary glass we see all around us.

78. Which of this component is used to make green-tinted glass?

- a) Iron
- b) Lead
- c) Chromium
- d) Both a and c**

Explanation

Other chemicals are added to change the appearance or properties of the finished glass. For example, iron and chromium based chemicals are added to the molten sand to make green-tinted glass.

79. What is the main component of the oven-proof glass?

- a) Boron oxide**
- b) Phosphorous
- c) Silica gel
- d) Ferrous oxide

Explanation

Oven-proof borosilicate glass (widely sold under the trademark PYREX) is made by adding boron oxide to the molten mixture. Adding lead oxide makes from a sandwich or laminate of multiple layers of glass and plastic bonded together.

80. Which of this glass type is used in vehicle wind shields?

- a) Toughened glass**
- b) Opaque glass

- c) Thin glass
- d) All the above

Explanation

Toughened glass used in car wind shields is made by cooling molten glass very quickly to make it much harder.