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1. **How will you categorize the following under domestic and industrial wastes?**
   Rags, used containers, old newspapers, mine tailing (left overs), flyash, kitchen waste, broken bricks.
   Solution:

Domestic waste	Industrial waste
Rags	mine tailing
used containers	flyash
old newspapers	broken bricks
kitchen waste	

2. **What is bagasse?**
   Solution:
   It is the plant residue left after extracting the sugarcane juice. It is used as fire wood or in paper industry.

3. **Name any two categories of chemicals which are washed off as wastes from agricultural fields.**
   Solution:
   The chemicals that are washed off as wastes from agricultural fields are – Pesticides and Fertilizers.

4. **What are the two portions into which the municipal sewage is separated?**
   Solution:
   The two portions into which the municipal sewage is separated are:
   - Degradable part – capable of being broken down chemically into non-toxic parts
   - Non-degradable part – They are dumped and buried at safe places.

5. **In which category of wastes will you include the non-functioning discarded**
   (i) Mobile phones,
   (ii) Thermometers,
   (iii) Photocopying machines.
   Solution:
   The category of waste in which the non-functioning discarded mobile phones, thermometers and photocopying machines can be included is e-waste. E-waste is the abbreviation of electronic waste and consists of the discarded appliances using electricity.

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1. **Name the three categories of wastes under segregation**

   Solution:

   The three categories of wastes under segregation are:
   - Reusable
   - Degradable
   - Non-degradable

2. **Which categories of wastes require dumping?**

   Solution:

   The categories of waste that requires dumping is the non-degradable waste.

3. **Is it true that composting is a useful method contributing in crop farming?**

   Solution:

   Yes, it is true that composting is a useful method contributing in crop farming as composting means putting the waste organic matter to decay so that it can be used for fertilizing the agricultural land.

4. **What is sludge?**

   Solution:

   Sludge is a solid precipitated material produced during second treatment of waste water (effluent) when it is pumped into oxidation ponds where the microbes oxidize the organic matter releasing carbon dioxide during the process, carried out in the Effluent Treatment Plants.

5. **Can incineration lead to certain kind of pollution/ Yes/No.**

   Solution:

   Yes, incineration can lead to certain kind of pollution as during the process of incineration, fumes and harmful substances are released.

6. **Name two types of devices used for removing particulate air pollutants.**

   Solution:

   The two types of devices used for removing particulate air pollutants are:
   - Scrubbers
   - Plate type electrostatic precipitators

Review Questions

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A. Multiple Choice Type

1. The most convenient reusable wastes are

(a) Old newspapers
(b) Broken glass
(c) Flyash
(d) Medical instruments

Solution:

(a) Old newspapers

They are common wastes that is recycled for its reuse in the paper industry.

2. The most rapidly increasing and much harmful waste today is

(a) Plastics
(b) Pesticides
(c) Municipal sewage
(d) Electronic waste

Solution:

(a) Plastics

Plastic is a domestic waste that are usually given out from homes.

B. Very short answer type

1. Name the following:

(a) The solid precipitated material produced during secondary treatment of the effluent, carried out in the Effluent Treatment Plants.
(b) The two types of devices commonly used for removing the particulate air pollutants.

Solution:

(a) Sludge
(b) Scrubber, plate type electrostatic precipitators.

2. Mention whether the following statements are true (T) or false (F).

(a) Some of the electronic wastes may contain valuable metals such as gold and copper-T/F
(b) Flyash is the gaseous waste of cement industry T/F
(c) Electricity is one of the primary needs of human society T/F

Solution:

(a) The statement is true.
(b) The statement is true.
(c) The statement is false. Electricity is not one of the primary needs but secondary needs of human society.

3. Match the items in Column I with as many items as possible in Column II.

	Column I	Column II
1.	Cow dung	(i) Sugarcane
2.	Bagasse	(ii) Raddiwalas
3.	Old newspapers	(iii) Manure

Solution:

	Column I	Column II
1.	Cow dung	Sugarcane Manure
2.	Bagasse	Sugarcane
3.	Old newspapers	Raddiwalas Sugarcane

C. Short Answer Type

1. Differentiate between degradable and non-degradable type of waste.

Solution:

The differences between degradable and non-degradable type of wastes are:

Degradable Type of waste	Non-degradable type of waste
It is the waste that can be decomposed by micro-organisms	These are the wastes that cannot be decomposed by micro-organisms
Example – Paper, clothes	Example - Plastic

2. Give reasons for the following:

(a) Broken glass utensils are a kind of non-degradable waste.

(b) Landfills are coming up fast near large cities.

(c) Why is municipal sewage is first separated into degradable and non-degradable wastes?

Solution:

(a) It is because they cannot be decomposed and disintegrated by living micro-organisms. They are required to be disposed in deeply dug pits so as to cause no harm. One of the applications of broken glass is that it can be used in glass industries in larger quantities after melting them.

(b) It is because of the tremendous growth in population and lack of using efficient and safe methods of disposal. The newer construction activities in new colonies produce large quantities of waste stones, broken bricks, pebbles and wastes from wood which are used as landfills observed in suburbs.

(c) It is because degradable wastes can be decomposed into non-toxic waste in septic tanks but non-degradable waste requires to be buried at safe places in order to avoid hazardous effects.

D. Long Answer Type

1. Define electronic waste and list at least six items which come under this category.

Solution:

Electronic waste consists of discarded appliances that use electricity such as old computers, TVs, refrigerators, cell phones etc.

Items under this category are:

- Medical instruments
- Lead acid batteries
- Mobile phones
- Refrigerators
- Electronic toys
- Fluorescent tubes

2. List some of the common wastes produced in mining operation and mention how these can be reused.

Solution:

Some of the common wastes produced in mining operation and their reuse is as follows:

- Dust
- Coal
- Iron
- Copper
- Zinc

During the process of mining, a large quantity of waste material is generated which is referred to as mine tailing which is the residue or the left over. The application of mine tailing is that it can be mixed with materials for tile production and masonry cement.

3. Describe the procedure usually used to produce compost

Solution:

Composting is the process of rotting and conversion of organic waste into manure and the product formed during the process of composting is called as compost.

Method to prepare compost:

- A trench of about 5m long, 1.5m wide and 1.5m deep is dug.
- A layer of well mixed refuse and waste is spread in it for about 30cm thickness
- This layer is fully wetted with a watery mixture of cow-dung and some mud.
- A second layer of mixed refuse is spread over the first layer till the heap rises to project over the ground level by about half a metre.
- Leave the set up undisturbed for around 3 months during which water is sprinkled at regular intervals
- A trench is then opened and the material is taken out and rearranged in conical heaps and covered with a layer of soil.
- Compost is ready after 50-60 days to be used in fields for cultivation or in garden flower beds etc.

4. Describe the usefulness of incineration of wastes, and also mention the precautions required in it.

Solution:

Incineration is the disposal of waste by burning which causes the release of fumes and other toxic

substances. The residue after incineration contains about 25% of wastes in the form of ash which should be deposited in landfills.

Usefulness of incineration of wastes:

- The left over ash occupies much lesser landfills.
- Electricity can be generated from the heat released during burning.

Precautions:

- The process should be carried out at very high temperatures
- Should be equipped with pollution control devices
- Incinerators should be installed away from residential areas.