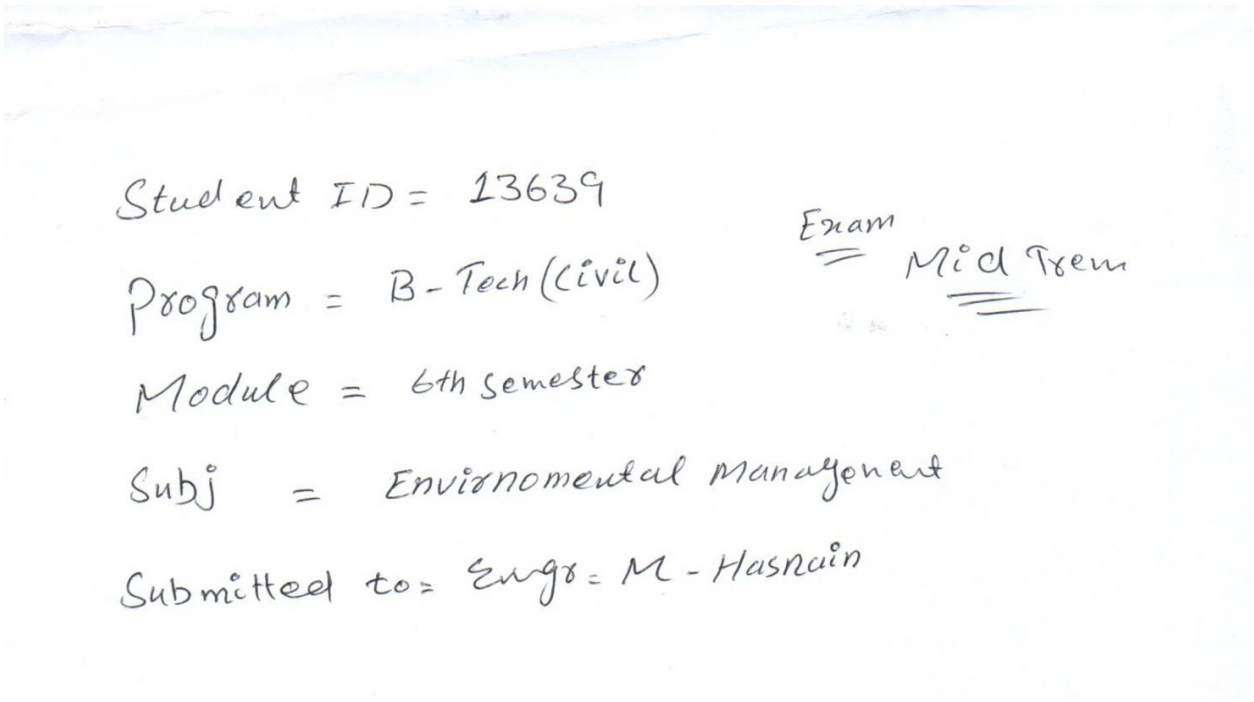

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Introduction

WASTE

• It is a matter for which a specific owner ceases to have use for it. It is also any unwanted or discarded matter.

• It can be in a solid, liquid or in a gaseous form.

• A product, material or container is not considered waste until someone throws it away

Types of Waste

1. Liquid Waste

Liquid waste is commonly found both in households as well as in industries. This waste includes dirty water, organic liquids, wash water, waste detergents and even rainwater.

2. Solid Rubbish

Solid rubbish can include a variety of items found in your household along with commercial and industrial locations.

3. Organic Waste

Organic waste is another common household. All food waste, garden waste, manure and rotten meat are classified as organic waste.

4. Recyclable Rubbish

Recyclable rubbish includes all waste items that can be converted into products that can be used again. Solid items such as paper, metals, furniture and organic waste can all be recycled.

5. Hazardous Waste

Hazardous waste includes all types of rubbish that are flammable, toxic, corrosive and reactive.

Sources of waste

There are many sources of waste present on the earth, some of the source of waste are;

Residential, industrial, commercial, institutional, MSW, construction and agriculture.

<u>Residential Waste</u>

In a resident the source of waste are generated by a single or multifamily dwelling .the types of wastes that are produced by Residences include.

Food waste: is food that is wasted, lost or uneaten .the causes of food waste or loose are numerous and occur at the stages of producing, processing, retailing and consuming.

Plastic waste: bags, containers, jars, bottles etc.

Textile waste : is a material that is deemed unusable for original purpose by the owner .textile can include fashion and textile industry waste , create during fiber ,textile and clothing production and consumer waste create during consumer use and disposal .

Paper/card waste: packaging materials, newspapers, cardboards etc.

Tins and metals – This can be found in various forms throughout your home

Ceramics and glass – These items can easily be recycled. Look for special glass recycling bins and bottle banks to dispose them correctly.

Wood waste: is the portion of the waste stream that can include discarded wood products, whole trees, stumps or pruned branches generated during street and park.

Ashes waste:

They come from the burning of solid fossil fuels like coal , wood and coke ,many houses and road side eateries still use these fuels ,open burning of waste also generates ashes .

University Waste

Restaurant waste is the waste that's thrown out by either the restaurant or the consumer. This can be broken down into three categories: pre-consumer waste, post-consumer waste, and disposables. Each of these types of waste can cause their own problems for a restaurant

Pre-Consumer Food Waste

this is food that's wasted because of issues within the restaurant. Whenever food spoils, expires, is improperly cooked or spilled, it can no longer be sold and needs to be thrown away.

Post-Consumer Food Waste

this is waste that primarily comes from the consumer. It includes food that's left on plates to be thrown away by restaurants and leftovers that are never finished.

Disposables:

Restaurant waste isn't all about food. Things like packaging, napkins, paper plates, and plastic utensils are also a part of the waste that both consumers and restaurants create.

The main waste products are

- **Paper**
- **Cardboard**
- **Plastics**
- **Wood**
- **Food Waste**
- **Glass**
- **Metals**
- **Special waste**
- **Hazardous Waste etc.**

Hospital Waste

Hospital waste means, clinic laboratory and dispensary waste.
Hospital waste include both risk and non-risk waste.
It may include wastes like sharps, soiled waste, disposables, anatomical waste, cultures, discarded medicines, chemical wastes, etc.

Examples

Human or animal tissues, blood or other bodily fluids, excretions, swabs or dressing, syringes and needles.

Following different quantities of hospital waste:
Non-risk waste

- **Paper**
- **Cardboard**
- **Packing**
- **Food Waste**
- **Aerosols and the like**

Risk waste

- **Infection waste**
- **Pathological waste**
- **Sharps**
- **Pharmaceutical waste**
- **Nontoxic waste**
- **Chemical waste**
- **Radioactive waste**

Industrial Waste

Industrial waste is the waste produced by industrial activity which includes any material that is rendered useless during a manufacturing process such as that of factories, industries, mills, and mining operations. Types of industrial waste include dirt and gravel,

masonry and concrete, scrap metal, oil, solvents, chemicals, scrap lumber, even vegetable matter from restaurants. Industrial waste may be solid, liquid or gaseous. It may be hazardous or non-hazardous waste. Hazardous waste may be toxic, ignitable, corrosive, reactive, or radioactive. Industrial waste may pollute the air, the soil, or nearby water sources, eventually ending up in the sea.

The activities that are causing pollution include:

- **Burning fossil fuels like oil, natural gas, and petroleum.**
- **Burning coal.**
- **Chemical solvents used in dyeing and tanning industries.**
- **Untreated gas and liquid waste being released into the environment.**
- **Improper disposal of radioactive material**

Chemical Waste

Chemical waste is typically generated by factories, processing centers, warehouses, and plants .this waste may include harmful or dangerous chemical and chemical residue.

Laboratory waste containers

- **Packaging**

How to properly label, package, and store chemical waste safely.

For packaging, chemical liquid waste containers should only be filled up to 75% capacity to allow for vapor expansion and to reduce potential spills which could occur from moving overfilled containers. Container material must be compatible with the stored hazardous waste.

- **Labelling**

Label all containers with the group name from the chemical waste category and an itemized list of the contents. All chemicals or anything contaminated with chemicals posing a significant hazard. All waste must be appropriately packaged.

- **Storage**

When storing chemical wastes, the containers must be in good condition and should remain closed unless waste is being added. Hazardous waste must be stored safely prior to removal from the laboratory and should not be allowed to accumulate.

Chemical Waste Collection

The Chemical Waste Collection is solely for the disposal of chemical waste that is generated as a direct result of routine laboratory operations. The materials that can be accepted include, but is not limited to:

- **Research solvent waste;**
- **Scintillation vials;**

- **Chemically contaminated sharps,**
- **Chemically contaminated materials used to clean up a chemical spill.**

Hazardous waste

• Industrial and hospital waste is considered hazardous as they may contain toxic substances

• Hazardous wastes could be highly toxic to humans, animals, and plants;

• They are corrosive, highly inflammable, or explosive; and react when exposed to certain things such as gases.

EFFECTS OF WASTE

• Affects our health

• Affects our socio-economic conditions

• Affects our coastal and marine environment

• Affects our climate

• Foul smell

• Increase is disease transmitting vectors

• Global warming

• Eutrophication

• Ground water contamination

Solid Waste Treatment

- **Waste Prevention and Minimization**
- **Re-use**
- **Recycle**
- **Composting**
- **Land filling**

Waste Prevention Minimization

Is a set of processes and practices intended to reduce the amount of waste produced? By reducing or eliminating the generation of harmful and persistent wastes, waste minimization supports efforts to promote a more sustainable society.

Reuse of waste

Reuse of waste means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived. ... The term recycling specified inwaste specific Directives does in particular not include backfilling operations .

Advantages of Reuse

• Energy and raw materials savings as replacing many single use products with one reusable one reduces the number that need to be manufactured.

• Reduced disposal needs and costs.

• Refurbishment can bring sophisticated, sustainable, well paid jobs to underdeveloped economies.

• Cost savings for business and consumers as a reusable product is often cheaper than the many single use products it replaces.

Disadvantages of Reuse

• Reuse often requires cleaning or transport, which have environmental costs. • Some items, such as Freon appliances or infant auto seats, could be hazardous or less energy efficient as they continue to be used. • Sorting and preparing items for reuse takes time, which is inconvenient.

Recycling

Recycling is the process of converting waste materials into new materials and objects. ... Recycling can prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution (from incineration), and water pollution (from landfilling).

Advantages of Recycling

- **Saves limited natural resource**
- **Prevents greenhouse gas emissions and water pollutants**
- **Saves energy**
- **Provides raw materials for industry and creates jobs**
- **Saves landfill space**

Composting of waste

- **Composting is the biological decomposition of organic waste such as food or plant material by bacteria, fungi, worms and other organisms under controlled aerobic (occurring in the presence of oxygen) conditions. The end result of composting is an accumulation of partially decayed organic matter called humus .**
  Benefits of Composting

  1. Keeps organic wastes out of landfills. 2. Provides nutrients to the soil. 3. Increases beneficial soil organisms (e.g., worms and centipedes). 4. Suppresses certain plant diseases. 5. Reduces the need for fertilizers and pesticides. 6. Protects soils from erosion. 7. Assists pollution remediation.

Land Fill

- **Is the most traditional of waste disposal**
- **Waste is directly dumped into disused quarries , mining voids or borrow pits**
- **Disposed waste is compacted and covered with soil**
- **Gases generated by the decomposing waste material are often burnt to generate power**
- **It is generally used for domestic waste**

Land filling

- **Features**
- **Careful and scientific site selection**
- **Controlled dumping**
- **Compaction of waste**
- **Provision for collecting leachates**

Treatment /Disposal methods

- **Incineration**
- **Deep burial**
- **Secured landfilling**
- **Chemical disinfection**
- **Steam sterilization (Auto calving)**
- **Thermal deactivation**
- **Irradiation and microwave treatment**

Summary

Solid waste management is defined as the discipline associated with control of generation, storage, collection, transport or transfer, processing and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economic, aesthetic, engineering, and other environmental.

Waste can be classified into five types of waste which is all commonly found around the house. These include liquid waste, solid rubbish, organic waste, recyclable rubbish and hazardous waste. Make sure that you segregate your waste into these different types to ensure proper waste removal.

Restaurant waste is an unfortunate side effect of the industry and if not properly managed, it can get out of control, costing a business, time, energy, space, and money. There are a bunch of different ways restaurant waste can harm the restaurant it comes from, as well as the world around it. Understanding what restaurant waste is, and what causes it, is an essential step in finding ways to avoid or reduce it.

Conclusion

It is found that with increase in the global population and the rising demand for food and other essentials .there has been a rise in the amount of waste being generated daily by each household .waste that is not properly managed especially excreta and other liquid and solid waste from households and the community . Are a serious health hazard and lead to the spread of infectious diseases.

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Environmental Management

Prob

Given Data

Population of the area = 8000

Generating waste from the population is

= 0.12 Kg/day

Waste generating from houses is

= 50 Kg/day.

Total No. of houses

= 500 houses

Waste generating from dispensary

2 tons/month $= \frac{2 \times 1000}{30} = 66.67$ Kg/day

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Environmental Management

Assume that Resturants generated

Waste = 100 kg/day

Area of dumping = ?

Depth = 0.5m

Sol:

(1) Waste generated from population

= 8000 × 0.12

= 960 kg/day

(2) Waste generated from Houses

= 500 × 50

= 25,000 kg/day

(3) Waste generated from Resturant = 100 kg/day

(4) waste generated from Dispensary =

= 66.67 kg/day

Environmental Management

(5)

Total waste = 960 + 25,000 + 66.67

= 26,126.67 kg/day

(6)

Density

$V = \frac{m}{d}$

$V = \frac{26126.67 \text{ kg/day}}{120 \text{ kg/m}^3}$

Assume density = 120 kg/m³

$V = 217.72 \text{ m}^3/\text{day}$

(7) Area required for Dumping

$A = V/D$

$A = \frac{217.72 \text{ m}^3}{0.5 \text{ m}}$

$A = 435.44 \text{ m}^2$

Ans