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7.1.4 Describe the facilities in the institution for the management of the following types of degradable and non-degradable waste

- **Solid waste management**
- **Liquid waste management**
- **Biomedical waste management**
- **E-waste management**
- **Waste recycling system**

S.NO.	DESCRIPTION
1	Certificate of the Head of the Institution
2	Geotagged Photos
3	Solid Waste Management
4	Liquid Waste Management
5	Biomedical Waste Management
6	E-waste Management
7	Waste Recycling System

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CERTIFICATE OF THE HEAD OF INSTITUTION

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Prof. Sapna Das
Principal

TO WHOMSOEVER IT MAY CONCERN

This is to certify that, the Institution has the following facilities for the management of the following types of degradable and non-degradable waste

- Solid waste management
- Liquid waste management
- Biomedical waste management
- E-waste management
- Waste recycling system

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SOLID WASTE MANAGEMENT

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SOLID WASTE MANAGEMENT

Solid waste management encompasses the systematic processes and actions necessary to handle waste from its origin to its ultimate disposal. This includes the collection, transportation, treatment, and disposal of waste, along with the oversight and regulation of the waste management process, as well as adherence to waste-related laws, technologies, and economic frameworks. Waste can be categorized into solid, liquid, or gas, each requiring distinct disposal and management methods. While liquid waste (specifically water) management has been previously outlined, the presence of hospitals as key institutions necessitates a comprehensive waste management strategy that includes industrial, biological, household, municipal, organic, biomedical, and radioactive waste.

Healthcare Waste

Proper classification and management of healthcare or medical waste are essential for preventing infection spread and protecting the environment. Hospital waste can be categorized based on certain characteristics, each demanding specific management approaches.

Infectious Waste (Biomedical Waste):

Definition: Waste that potentially contains pathogens, such as blood and bodily fluids.
Management: Collected in color-coded, leak-proof containers marked with biohazard symbols. It is then sterilized or treated via autoclaving to eliminate pathogens before disposal. Final disposal occurs through incineration or other authorized methods, like IMAGE.

Hazardous Chemical Waste:

Definition: Waste resulting from the use of chemicals, including expired medications and lab reagents.
Management: Stored separately in clearly labeled containers. Disposal is in accordance with hazardous waste regulations, often through certified hazardous waste disposal services.

Sharps Waste:

Definition: Waste that includes needles, syringes, lancets, and other sharp instruments.
Management:Collected in puncture-resistant containers. After sterilization (typically through autoclaving), disposal follows the appropriate methods, such as IMAGE.

Pharmaceutical Waste:

Definition: Discarded or unused medications, including controlled substances.

Management: Collected and stored separately. Disposed of via incineration or authorized pharmaceutical disposal programs.

General Non-Hazardous Waste:

Definition: Non-infectious waste from healthcare settings, akin to regular municipal waste.

Management: Collected in standard bins or bags. Disposed of through incineration, landfill, or recycling, adhering to local regulations.

Anatomical Waste:

Definition: Human or animal body parts and tissues.

Management: Stored in labeled containers. Disposed of through incineration or other approved methods.

Recyclable Waste:

Definition: Materials such as paper, cardboard, plastics, and glass suitable for recycling.

Management: Collected separately and recycled through designated programs.

Effective hospital waste management requires source segregation, safe storage, transport, and compliant disposal methods. Facilities should implement clear protocols and staff training to prevent health risks and environmental harm.

Miscellaneous waste disposal and Management.

The disposal and management of miscellaneous waste are essential components of environmental responsibility and public health. Effective waste disposal and management strategies are vital in reducing the harmful effects of waste on the environment, human health, and overall quality of life.

Types of Waste

Solid Waste: Comprises household, industrial, commercial, and construction debris.

Biodegradable Waste: Organic materials that decompose naturally, such as food scraps and yard trimmings.

E-waste: Disposed electronic and electrical devices.

Waste Reduction

The most efficient waste management approach is source reduction, which entails minimizing waste generation through recycling, reusing, and choosing products with less packaging. This includes optimizing material use by repairing and reusing electronic components, computers, equipment, and construction materials for rebuilding or other suitable applications.

Waste Collection

Waste is gathered from various locations, including homes and businesses, using methods like curbside pickup or drop-off centers, and is stored in designated areas for further processing.

Waste Segregation

Waste segregation is the process of separating different waste types at the source or prior to disposal to enhance recycling, treatment, and disposal. Its main goal is to minimize environmental impact, conserve resources, and ensure safe handling of hazardous materials.

Recycling

Recycling is the conversion of waste materials into new products. Commonly recycled items include paper, cardboard, glass, plastic, and metal, helping to conserve resources and decrease landfill waste.

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BINS TO COLLECT BIODEGRADABLE & NON BIO DEGRADABLE WASTES

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COLLECTION OF NON BIO DEGRADABLE WASTES BY HARITHAKARMASENA

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LIQUID WASTE MANAGEMENT

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LIQUID WASTE MANAGEMENT

Liquid waste management involves the collection, treatment, and disposal or reuse of liquid waste, such as wastewater, sewage, industrial effluents, and stormwater, to minimize environmental and health impacts. Here's a concise overview based on current knowledge and practices:

Types of Liquid Waste

- Domestic Wastewater: Includes sewage and greywater (from households, e.g., sinks, showers).

- Industrial Effluents: Liquid waste from industries, often containing chemicals, heavy metals, or organic pollutants.

- Stormwater: Runoff from rain or snowmelt, which may carry pollutants like oil, sediments, or debris.

- Hazardous Liquid Waste: Includes toxic, flammable, or corrosive liquids, such as chemical solvents or medical waste.

Key Processes in Liquid Waste Management

1. Collection:

- Sewer Systems: Centralized networks collect domestic and industrial wastewater for treatment.
- Septic Systems: Used in rural or decentralized areas, where waste is collected and partially treated onsite.
- Tanker Trucks: For hazardous or non-sewered waste, transported to treatment facilities.

2. Treatment:

- Preliminary Treatment: Screening and grit removal to eliminate large solids and debris.

- Primary Treatment: Sedimentation to remove suspended solids, producing sludge.

- Secondary Treatment: Biological processes (e.g., activated sludge, trickling filters) to degrade organic matter.

- Tertiary Treatment: Advanced processes like filtration, disinfection (UV or chlorination), or chemical treatment to remove nutrients, pathogens, or specific pollutants.

- Industrial Treatment: Specialized processes like reverse osmosis, chemical neutralization, or advanced oxidation for effluents with heavy metals or toxic compounds.

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LIQUID WASTE MANAGEMENT

3. Disposal or Reuse:

• Disposal: Treated wastewater is discharged into water bodies (following environmental regulations) or injected into deep wells (for hazardous waste).

• Reuse: Treated water is used for irrigation, industrial processes, or non-potable urban applications (e.g., toilet flushing). In some cases, advanced treatment allows potable reuse.

• Sludge Management: Sludge from treatment is dewatered, treated (e.g., anaerobic digestion), and either landfilled, incinerated, or used as fertilizer.

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BIOMEDICAL WASTE MANAGEMENT

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STUDENTS DISCARDING BIOMEDICAL WASTE IN COLOUR CODED BINS

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E-WASTE MANAGEMENT

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E-Waste Management

E-waste management involves the collection, recycling, refurbishment, and disposal of electronic waste (e-waste) to minimize environmental and health risks while recovering valuable materials. Here's a concise overview based on current practices and knowledge:

What is E-Waste?

E-waste includes discarded electronic devices like computers, smartphones, TVs, batteries, and appliances. It contains valuable materials (e.g., gold, copper, rare earth metals) and hazardous substances (e.g., lead, mercury, cadmium).

Key Processes in E-Waste Management

1. Collection:

- Drop-off Points: Designated centers or bins for households to deposit e-waste.
- Take-back Programs: Manufacturers or retailers (e.g., Apple, Dell) offer return programs for old devices.
- Curbside Collection: Some municipalities include e-waste in recycling pickups.
- Informal Sector: In developing countries, informal collectors often gather e-waste, though this can lead to unsafe handling.

2. Sorting and Dismantling:

- Manual or automated sorting separates reusable, recyclable, and hazardous components.
- Devices are dismantled to recover parts like circuit boards, plastics, and metals.

3. Recycling and Recovery:

- Material Recovery: Metals (e.g., gold, silver, copper) are extracted via smelting, chemical leaching, or hydrometallurgical processes.
- Component Reuse: Functional parts (e.g., hard drives, screens) are refurbished for use in repaired devices.
- Plastic Recycling: Plastics are shredded, cleaned, and processed into new products.
- Hazardous Waste Treatment: Toxic components like batteries or CRTs are treated separately to prevent environmental contamination.

4. Disposal:

- Non-recyclable or hazardous residues are disposed of in secure landfills or incinerated with energy recovery, following strict regulations.

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WASTE RECYCLING SYSTEM

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Waste Recycling System

waste recycling system is a structured process for collecting, sorting, processing, and converting waste materials into reusable products or raw materials to reduce landfill use, conserve resources, and minimize environmental impact. Below is a concise overview of waste recycling systems, integrating aspects of liquid waste and e-waste management where relevant, based on current practices and knowledge.

Components of a Waste Recycling System

1. Collection:

• Curbside Collection: Bins for recyclables (paper, plastic, glass, metals) are collected from households or businesses.

• Drop-off Centers: Designated locations for specific waste types, including e-waste (e.g., electronics, batteries) and hazardous liquids (e.g., oils, chemicals).

• Specialized Systems: Tanker trucks for liquid waste (e.g., sewage, industrial effluents) or take-back programs for e-waste (e.g., retailer programs for old devices).

• Informal Sector: In some regions, informal collectors gather recyclables, though this can lead to unsafe handling, especially for e-waste.

2. Sorting:

• Manual Sorting: Workers separate materials at collection points or facilities, common for mixed waste or e-waste components.

• Automated Sorting: Technologies like optical sorters, magnets, or AI-based systems separate materials (e.g., plastics by type, metals from e-waste).

• Liquid Waste Sorting: Industrial effluents are categorized based on chemical composition for appropriate treatment.

3. Processing:

• Solid Waste:

• Plastics: Cleaned, shredded, and melted into pellets for new products.

• Paper/Cardboard: Pulped and reformed into new paper products.

• Glass: Crushed, melted, and reshaped into containers or aggregates.

• Metals: Smelted and refined for reuse in manufacturing.

• E-Waste: Circuit boards, metals (e.g., gold, copper), and plastics are separated via mechanical shredding, chemical leaching, or hydrometallurgical processes. Hazardous components (e.g., batteries, mercury) are treated separately.

• Liquid Waste: Wastewater undergoes primary (sedimentation), secondary (biological treatment), and tertiary (disinfection, filtration) processes. Sludge is processed for energy (biogas) or fertilizer use.

Waste Recycling System

4. Reuse or Conversion:

• Recycled Products: Materials are turned into new goods (e.g., recycled plastic bottles, refurbished electronics).

• Resource Recovery: E-waste yields valuable metals; liquid waste treatment recovers water for irrigation or industrial use.

• Energy Recovery: Non-recyclable waste is incinerated with energy capture (e.g., waste-to-energy plants) or anaerobically digested (for liquid waste sludge).

5. Disposal:

• Non-recyclable residues (e.g., contaminated plastics, hazardous e-waste components) are sent to secure landfills or incinerated under strict regulations.

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STUDENTS MAKING PAPER BAGS FROM WASTE PAPERS TO USE DURING CLINICAL PROCEDURES

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USING RECYCLED PAPER BAGS TO DISACRD DRY COTTON AFTER CLINICAL PROCEDURES