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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VII - THEORY EXAMINATION (2024- 2025)

Subject: Waste management and Upscaling

Time: 3 Hours Max. Marks: 100

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A 20

1. Attempt all parts:-

1-a. What is the primary characteristic of waste? (CO1, K1) 1

(a) It is generated through deliberate human actions

(b) It is always harmful to the environment

(c) It is a finite resource that can be depleted

(d) It has no economic, social, or environmental value

1-b. What is the role of a clarifier in an ETP? (CO1, K2) 1

(a) It removes suspended solids through sedimentation

(b) It disinfects the wastewater using UV light

(c) It reduces the chemical oxygen demand (COD) of the effluent

(d) It adds nutrients to the water for aquatic plant growth

1-c. Why Do Plastics Fall Under a Difficult Material to Recycle? (CO2, K2) 1

(a) Because it is a very hard material

(b) Because plastic is very adhesive in its nature

(c) Because of different types of polymer resins

(d) Because of the different sizes of plastic

1-d. Which microorganisms are essential for the composting process? (CO2, K1) 1

(a) Bacteria and fungi

(b) Insects and rodents

(c) Reptiles and amphibians

(d) irds and mammals

1-e. What is the key benefit of using 3D printing with recycled materials in manufacturing? (CO3, K2) 1

(a) Higher production costs

(b) Reduced design flexibility

(c) Lower environmental impact

(d) Limited material availability

1-f. Which type of waste can be effectively treated using bioremediation techniques? (CO3,K2) 1

(a) Electronic waste

(b) Hazardous waste

(c) Paper waste

(d) Glass waste

1-g. Which international agreement aims to reduce the transboundary movement of hazardous waste and promote environmentally sound management of such waste? (CO4, K2) 1

(a) Paris Agreement

(b) Basel Convention

(c) Kyoto Protocol

(d) Montreal Protocol

1-h. Which term describes the process of converting organic waste into nutrient-rich soil conditioner? (CO4, K2) 1

(a) Landfilling

(b) Incineration

(c) Composting

(d) Recycling

1-i. Which of the following is an example of "upcycling" in waste management? (CO5, K1) 1

(a) Composting food scraps into nutrient-rich soil

(b) Turning plastic bottles into new plastic products

(c) Burning waste to generate electricity

(d) Repurposing old furniture into unique home décor

1-j. What is the role of extended producer responsibility (EPR) in sustainable waste management? (CO5, K2) 1

(a) Shifting the responsibility for waste management from producers to consumers

(b) Holding producers accountable for the entire lifecycle of their products, including disposal

(c) Encouraging consumers to dispose of products responsibly

(d) Promoting the export of products to other countries for recycling

2. Attempt all parts:-

2.a.	What is the definition of waste management and its importance in sustainable development? (CO1, K2)	2
2.b.	What are the environmental concerns associated with waste incineration? (CO2, K2)	2
2.c.	Mention any specific health risks associated with waste recycling. (CO3, K3)	2
2.d.	What are the main steps involved in conducting a lifecycle analysis? (CO4, K2)	2
2.e.	How does waste upcycling differ from recycling? (CO5, K2)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Discuss the importance of vehicle emission standards in reducing air pollution. (CO1, K2)	6
3-b.	Discuss the application of technologies such as activated carbon adsorption, membrane filtration in achieving higher pollutant removal efficiency. (CO1, K2)	6
3-c.	What measures are taken to ensure the safe and responsible operation of waste incineration plants, particularly regarding emissions and ash management? (CO2,K2)	6
3-d.	Write short notes on anaerobic digestion and pyrolysis.(CO2,K2)	6
3.e.	What are the key challenges associated with the management of landfill leachate, and how can they be addressed? (CO3,K2)	6
3.f.	Analyze the major sources of carbon emissions globally and their impact on the environment. (CO4,K3)	6
3.g.	How can governments, businesses, and individuals collaborate to promote and support waste upcycling initiatives on a larger scale? (CO5,K2)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Explain the difference between physical, chemical, and biological treatment processes. (CO1,K2)	10
4-b.	Elaborate the process of liquid waste collection, treatment and disposal system. (CO1,K3)	10

5. Answer any one of the following:-

5-a.	What are the potential future developments or advancements in energy from waste technology? (CO2,K2)	10
5-b.	In the context of waste-to-energy conversion, what are the most promising technological advancements that allow for efficient and sustainable generation of energy from waste? (CO2,K3)	10

6. Answer any one of the following:-

6-a.	Explain the potential health risks of exposure to hazardous substances during the waste recycling process and how they can be minimized. (CO3,K2)	10

6-b.	What is hazardous waste? List the possible risks for human health and environment. (CO3, k2)	10

7. Answer any <u>one</u> of the following:-

7-a.	Explain the concept of carbon footprinting and its significance in the context of climate change. How does it relate to greenhouse gas emissions? (CO4,K2)	10
7-b.	In what ways have recent technological advancements improved the overall effectiveness and efficiency of waste recycling and recovery processes, leading to the production of higher quality value-added products? (CO4,K3)	10

8. Answer any <u>one</u> of the following:-

8-a.	Explain the concept of waste upcycling and how it is different from other waste management practices such as recycling and disposal? (CO5,K2)	10
8-b.	How Smart Tech Is Changing the Future of Waste Management? (CO5,K2)	10