

Model Question Paper  
Sixth Semester-Civil Engineering  
Subject: Solid Waste Management

Sub Code:15CV651

Max Mark:80

Note: Answer any Five Questions, selecting one full question from each Module.

**Module-1**

1a. Define the terms: solid waste and solid waste management. (3)

b. Estimate the unit solid waste generation rate for a residential area having 800 dwellings. The observation made at local transfer station for a week time revealed that the waste was carried in self-compacting trucks and flatbed trucks, whose volume is  $15\text{m}^3$  and  $1.25\text{m}^3$  and the density of waste is  $295\text{kg/m}^3$  and  $110\text{kg/m}^3$  respectively. Assume 10 self-compacting truck and 20 flatbed truck loads per week. (6)

b. What are transfer stations? Explain the factors to be considered in the design of transfer station. (7)

OR

2a. Discuss the salient features of the Solid Waste (Management & Handling) Rules, 2000, with 2016 amendments. (8)

b. Estimate the moisture content, density and energy content (on dry basis and on ash free dry basis) of the solid waste sample using the data given below. .

Assume ash content as 5%. (8)

Component	% by mass	Moisture content, %	Density*, $\text{Kg/m}^3$	Energy**, $\text{kJ/kg}$
Food waste	12	70	290	4000
Paper	40	06	85	16000
Card board	08	05	50	16000
Plastics	04	02	65	32000
Grass trimmings	15	60	105	6500
Wood	05	20	240	18000
Tiin cans	16	03	90	700

\* Based on 100 kg waste sample, \*\* Based on 1000 kg waste sample

## **Module – 2**

3a. What is Incineration? With the help of a neat sketch, explain incineration process. (8)

b. Mention the different processing techniques adopted for physical, chemical and biological transformation of solid waste. (4)

c. What is meant by air pollution control? How the pollutants are categorized and mention the common air pollution control devices used in conjunction with incinerator. (4)

OR

4a. Explain the 3Ts of Incineration process. (6)

b. Discuss the governing factors considered in design of an incinerating system. (6)

c. Write an explanatory note on mechanical volume reduction. (4)

## **Module – 3**

5a. Enumerate and discuss the factors affecting aerobic composting. (6)

b. Determine the landfill area required for a population of 50000, given the following data.

i) Solid waste generation: 1.5 kg/person/day

ii) Compacted density of solid waste in landfill:  $500\text{kg/m}^3$

iii) Average compacted depth of solid waste: 3M (6)

c. Explain the area method of landfilling technique. (4)

OR

6a. What is composting? Distinguish between aerobic and anaerobic composting. (6)

b. Write an explanatory note on Vermicomposting. (4)

c. What is leachate? With neat sketch, discuss the control of leachate movement in sanitary landfill sites. (6)

## **Module – 4**

7a. Enumerate the various methods of treating bio-medical waste. Explain any one. (6)

b. Define hazardous waste. Explain the various sources of hazardous wastes. (6)

c. Enumerate the hazardous waste characteristics and explain any one. (4)

OR

8a. What is E-waste? What are the impacts of E-Waste on the environment? (6)

b. What is construction waste? Mention the materials that can be recycled? (6)

C. Write a note on identification and classification of hazardous waste. (4)

### **Module – 5**

9a. What is pyrolysis? With a neat sketch, explain the process of Pyrolysis. (8)

b. List the type of Incinerators. With a neat sketch, explain any one. (8)

OR

10a. With examples, explain the energy recovery technique used in the chemical and biological transformation of wastes. (8)

b. Explain the design criteria for Incineration. (8)