

Duration- 3 Hrs

Marks- 80

N.B.:

- 1) Question **number one** is **compulsory**.
- 2) Attempt **any three** of **remaining five** questions.
- 3) Assume **suitable data if required**.
- 4) Draw **neat sketches** wherever **necessary**.

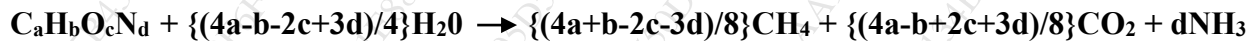
Q.1. Solve any four of the following:

(20)

- A. Volume reduction of solid waste.
- B. Explain factors affecting the generation rate of solid waste.
- C. State & explain characteristics of hazardous waste.
- D. Write a short note on Life Cycle Assessment in SWM
- E. What are the factors to be considered for selecting the landfill site.

Q.2. A) Estimate the volume of methane produce by anaerobic digestion of one tone of Waste having chemical composition $C_{55} H_{110} O_{35} N_2$

(10)



B) Explain with a neat sketch working of municipal incinerator.

(10)

Q.3 A) Explain Hauled container system and stationary container system with neat sketches.

(10)

B) What is composting? Explain various types of composting with advantages & disadvantages of each.

(10)

Q.4 A) Explain Physical , chemical and biological transformation of solid waste.

(10)

B) Explain the EPA identification of toxic and hazardous waste. Explain methods of disposal of hazardous waste

(10)

Q.5 A) Estimate the moisture content of MSW sample with following Composition (05)

Component	% by mass	Moisture content %
Food waste	20	70
Paper	40	6
Cardboard	10	5
Plastic	10	2
Garden trimings	10	60
Wood	5	20
Tin cans	5	3

B) Calculate the energy content of solid waste having the following composition (05)

using modified Dulong's formula. Figures in bracket are % by mass.

1) Carbon (36.3) 2) Hydrogen (7.3) 3) Oxygen (51.1) 4) Ash (4.7)

5) Nitrogen (0.5) 6) Sulphur (0.1)

C) Define Biomedical Waste. Give sources of generation of Biomedical Waste. Enlist (10)

different methods of disposal of Biomedical waste and explain any one in detail.

Q.6 Write short note on (any four) (20)

A) Pyrolysis

B) Transfer station

C) Legal aspects of solid waste disposal

D) 7' R' in SWM

E) Need of IOT in SWM
