Total number of printed pages: 02

PG/1st Semester/PGET1109

2023

Waste to Energy Conversion

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) Answer the short questions — 2 x 5 = 10

   i) Define radioactive waste.

   ii) What do you mean by mutagenic agents?

   iii) What do you mean by municipal solid waste?

   iv) Distinguish between aerobic and anaerobic composting.

   v) Define incineration.

   b) Fill in the blanks: — 4

   i)Hazardous wastes are listed in to F,K,P and U as per CFA as prescribed by _____.

   ii) K- Wastes are _____ .

   iii)Toxicity Characteristic Waste is abbreviated by code name_____.

   iv) One example of low level radioactive waste is _____ .

   c) Write short notes: — 2x3= 6

   i)Radioactive waste

   ii)Biodegradable solid waste

2. a) Give the schematic diagram for solid waste management. What are three sub-sections to elaborate solid waste management? Explain with proper diagram — 3+ 3+ 3 = 9

   b) Name the six characteristics of the waste because of which any waste can be classified as hazardous waste (regardless of their concentration limits). — 6

   c) Distinguish between biodegradable and non-biodegradable solid waste. — 5

3. a) What are the various factors which effect incineration? Write briefly. — 2+4 = 6

   b) A landfill area of (150 m x 100 m) is available for handling 25 years' municipal solid waste (MSW) for a town of 5,00,000 people. Out of the total landfill area only 80% is actually available for land fill and other is used for auxiliary services. Assuming that average per capita MSW — 3+3 =6

discard per year in town is 0.05 tonne, landfill density is 500 kg/m^3, and that the 15 percent of the actual landfill cell volume is used for soil cover, estimate

(i) the landfill lift in one year.

(i) number of years for which the land fill can be used if the landfill can't be increased

beyond 25 m.

c) What are radioactive wastes? Give the classification of radioactive wastes. 2+2 =4

d) Write short notes on 2 X2 = 4

i)Chemical characteristics of solid waste

ii)Calorific value of solid waste

4. a) Give the following answers 3 x5 =15

i) Distinguish between ultimate and proximate analysis.
ii) What are the classes of solid waste?
iii) Write short notes on density of MSW.
iv) What do you mean by size of waste constituents?
v) Give the explanation of codes T, H, I, C, E for solid wastes.

b) What are advantages and disadvantages of sanitary landfill? 5

5. a) What are the advantages of recycling MSW? Explain with proper schematic diagram. 3+2 = 5

b) Distinguish between incineration and landfill? 5

c) What is aerobic composting? Give the steps of aerobic digestion of MSW. Explain. 2+3+5 =10

6 Write short notes on (any four): 5x4= 20

a) K-list solid waste

b) Anaerobic Composting

c) Dumps and landfill

d) Thermal treatment of MSW

e) Biological waste treatment

*****