Total No. of printed pages = 5

PG/1st Sem/PGET 1109

2021

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 folloing questions : 2×3=6

   (i) Define K-list wastes.

   (ii) What do you mean by the term Teratogenic ?

   (iii) Define MSW.

   (b) Write short notes on : 2+2=4

   (i) Thermal treatment of solid waste

   (ii) Biological waste management

[Turn over

(c) Fill in the blanks : 1×4=4

(i) Chlorinated aliphatic hydrocarbon production is an example of _____.

(ii) Municipal solid wastes are _____.

(iii) Toxicity characteristic waste is abbreviated by code name _____.

(iv) Radioactive waste is a result of activities like _____.

(d) Match the following : 4

Group-A	Group-B
(i) Municipal waste	(a) Biodegradable
(ii) Paper waste	(b) Hazardous waste
(iii) Hospital waste	(c) Household waste
(iv) Toxic and Corrosive	(d) Radioactive waste
	(e) Non-biodegradable

(e) What are classes of HW ? 2

2. (a) What are the advantages of municipal waste recycling ? 4

(b) Give the schematic diagram for anaerobic composting. Explain the four steps of anaerobic digestion of MSW. 4+4=8

(c) What do you mean by sanitary landfill ? What are advantages and disadvantages of sanitary landfill ? 2+4=6

(d) Distinguish between aerobic and anaerobic digestion of MSW. 2

3. (a) What is incineration of MSW ? Mention the important factors which influence the incineration. Draw the schematic representation of controlled air incineration. 2+4+2=8

(b) Give the Salvato's recommended formula to calculate the annual volume of sanitary landfill and explain modern landfill with suitable diagram. 3+2=5

(c) Why to incinerate medicines ? What do you mean by medical waste incineration process ? 2+2=4

(d) Mention the main disadvantages of incineration. 3

4. (a) What are biodegradable and non-biodegradable solid waste ? Distinguish between biodegradable and non-biodegradable processes. 3+4=7

(b) Name the six characteristics of the waste because of which any waste can be classified as hazardous waste. 6

(c) How will you estimate the moisture content of MSW ? Give the equation. 5

(d) What are F-list wastes ? 2

5. (a) Explain three component diagram with proper explanation of combustible matter, non-combustible matter. 2+2+2=6

(b) A landfill area of (150m × 100m) is available for handling 25 years' municipal solid waste (MSW) for a town of 10,00,000. 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 discard per year is the town is 0.5 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

(ii) number of years for which the land fill can be used if can't be increased beyond 25m. 3+3=6

(c) Write short notes on ultimate analysis and proximate analysis of MSW. 4+4=8

6. (a) How will calculate the calorific value of solid waste with Bomb calorimeter. Explain with proper diagram. 3+3=6

(b) Explain the terms for physical characterisation of solid waste : 2×7=14

(i) Density

(ii) Moisture content

(iii) Size waste constituents

(iv) Calorific value

(v) Field capacity

(vi) Permeability

(vii) Compressibility.

7. (a) Write short notes on : 3×3=9

(i) Vermicomposting.

(ii) Biogas from municipal solid waste

(iii) Environmental impact of dumping of MSW.

(b) What are seven essential components of a MSW landfill ? 7

(c) Write short notes on waste minimization. 4