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10CV757

Seventh Semester B.E. Degree Examination, June/July 2019
Solid Waste Management

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. Explain the classification of Municipal solid waste. (10 Marks)
- b. Estimate the energy content of solid waste sample, with the following composition. Assume moisture content = 21% , Ash content = 5%. What is the energy content on dry basis and on ash free dry basis? (10 Marks)

Component	Food waste	Paper	Card board	Plastic	Garden Trimming	Wood	Tin cans
% by mass	15	45	10	10	10	05	05
Energy content kJ/kg	4650	16750	16300	32600	6500	18600	700

- 2 a. Explain briefly the factors affecting the generation of solid waste. (08 Marks)
- b. From the following data estimate the waste generation rate per day for a residential area consisting of 1200 houses. The observation location is a local transfer station that receives all the waste collected for disposal. The observation period is for one week. Also estimate per capita generation rate assuming 4 persons per house. (06 Marks)

Vehicle Type	No. of loads	Volume of vehicle (m ³)	Specific weight of solid waste (kg/m ³)
Compactor truck	10	15.30	296.5
Flat bed load	08	1.53	133.4
Private cars/trucks	25	0.23	88.9

- c. Explain with neat sketch, the operational task adopted with hauled container system in collection process of municipal solid waste. (06 Marks)
- 3 a. Explain the parameter 3T's factor affecting the incineration process. (10 Marks)
- b. What is Pyrolysis? Briefly explain the process of pyrolysis. (10 Marks)
- 4 a. Explain briefly the processing techniques involved in the treatment of municipal solid waste as well as material recovery. (10 Marks)
- b. Explain briefly, the different techniques of component separation. (10 Marks)
 - i) Garbage chute
 - ii) Route optimization technique.

PART - B

- 5 a. Discuss the factors affecting the anaerobic composting process. (10 Marks)
- b. Explain briefly Bangalore process of composting. (10 Marks)
- 6 a. Explain area method and trench method of land filling techniques. (10 Marks)
- b. With neat sketch, explain the methods of controlling gas movement, with vents and barriers. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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- 7 a. Explain the formation of leachate in the landfill. (10 Marks)
b. Determine the landfill area required for municipality, with population 50,000. Given that
i) Solid waste Generation = 450 gm/person/day.
ii) Compacted density of landfill = 504 kg/m³.
iii) Average depth of compacted solid waste = 5. (10 Marks)
- 8 Write short notes on :
a. Transfer station.
b. Vermi composting.
c. Biomedical waste disposal methods.
d. Mechanical volume reduction. (20 Marks)

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