Mid-West University

Examinations Management Office

End Semester Examinations 2081

Bachelor level/ B.E. Civil/ 7th Semester — Full Marks: 50
Time: 3 hours — Pass Marks: 25
Subject: Solid Waste Management (CE494)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. **a)** What are the types of Solid waste according to source, component, Composition & regulatory definition? **(4)**

b) Define Composting. Explain different type of composting? **(4)**

2. **a)** what is transfer Station? As a Planner, Where and when transfer stations should propose? Explain. What are the considerations to be met in the Construction of transfer station? **(6)**

b) Define Moisture Content in the solid waste. Calculate the heat value of PVC (C2HCL) using modified Dulongs Formula. **(4)**

3. **a)** The Composition of domestic waste generated in Nepalgunj Sub-Metropolitician City as determined by the Local Report analysis is given in table. **(8)**

Determine the following:

i) Overall moisture content of the waste?
ii) Heat energy?
iii) Approximate Chemical Formula?

Waste	Mass (%)	Moisture Content %
Food waste	25	75
paper	45	60
plastics	15	10
yard Waste	5	15
Tins/Can	10	2

Chemical Component	Mass kg
Carbon	45
Hydrogen	6
Oxygen	27
Nitrogen	0.9
Sulfur	0.4
Ash	6

b) Describe 3R Principle giving suitable examples used in hospital in Surkhet Valley. **(4)**

4. **a)** Solid waste from large hotels of Nepalgunj is collected in HCS basis using hoist truck. Time taken to reach the first container site from the garage is 30 min. and to the garage from the last location is 45 min. If the average time required to drive between containers is 5 min and oneway distance to the disposal site is 20 km (speed limit 40 kmph); determine number of containers that can be emptied per day based on 8 hr/d working schedule. What would be the amount of waste that can be collected in a day by this truck if the 4 m3 containers are in an average 3/4thfull. **(6)**

b) Explain different types of solid waste disposal methods. **(4)**

5. **a)** What is the area required for land filling the waste of Nepalgunj if the per capita waste generation is 350g (1 liter per capita by volume as discarded) and average projected population is 20 Lakh for one decade. Calculate the area required if 35% of the waste produced per capita is added for commercial and other wastes and 85% of the waste is expected to reach the landfill site. The density of waste after compaction in the landfill is expected to be 800 kg/m3. It is estimated that there will be 7 cells in 1 lift of 6 m including daily cover height of 15 cm and intermittent cover of 30 cm. The landfill allows maximum of 7 lifts. The landfill site is run for 6 days a week. **(6)**

b) How can be waste Minimized through input and processing changes in Industries? **(4)**

The End