

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –Ist SEMESTER–EXAMINATION – JULY- 2012

Subject code: 711803N

Date: 09/07/2012

Subject Name: Municipal and Hazardous Solid Waste Management

Time: 2:30 pm – 05:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Why is composition of solid waste important for management? Explain, in brief, the physical and chemical properties to be evaluated. **07**
- (b) Compare the hauled container system with stationary container system with respect to activities involved. **07**

- Q.2** (a) Explain the following terms with reference to processing of municipal solid waste: **07**
- (i) Compaction
 - (ii) Shredding
 - (iii) Pulping
- (b) Define and explain pick-up, haul, at-site and off-route with reference to hauled container system. Draw a schematic of operational sequence for conventional hauled container system and explain in detail. **07**

OR

- (b) Explain how GIS is useful in locating a landfill site. **07**

- Q.3** (a) Draw the flow diagram for front end system for processing and recovery of solid waste and explain it in detail. **07**
- (b) Enlist chemical conversion process for recovery of usable conversion products from solid waste and explain anyone in detail. **07**

OR

- Q.3** (a) Solve the following problem using graphical method: **07**
- $\text{Max } z = 1000x_1 + 850x_2$
subject to constraints
 $x_1 + x_2 \leq 11$
 $600x_1 + 500x_2 \leq 6000$

- (b) What is leachate? Explain the importance of leachate treatment and its recycling. **07**

- Q.4** (a) Explain single and double liner system for secured landfill site along with sketch **07**
- (b) Explain the significance of overall score in respect of potential of hazard obtained for ranking of alternative site through Delphi Technique. **07**

OR

- Q.4** (a) Define hazardous waste. List various categories of hazardous waste and explain any two in detail. **07**
- (b) Differentiate between stabilization and solidification with examples. **07**

- Q.5** (a) Explain the phase wise operation of landfill cells with sketch. **07**

- (b) Explain 'process modification' as a source reduction process for hazardous solid waste management. **07**

OR

- Q.5** (a) Discuss in brief various materials available for flexible membrane liner. Which according to you is preferable? **07**
- (b) Differentiate between macro encapsulation and micro encapsulation with examples. **07**
