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**

Max $z=1000x_1 +850 x_2$

subject to constraints

$x_1+ x_2 \leq 11$

$600 x_1 + 500 x_2 \leq 6000$

(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**

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