

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Examination January 2010****Subject code: 711803****Subject Name: Municipal and Hazardous Solid Waste Management****Date: 25 / 01 /2010****Time: 12.00 – 2.30 pm****Total Marks: 60****Instructions:**

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

- Q.1** (a) Describe types of municipal solid wastes **04**
 (b) Maximize $2x + 3$ subject to constraints **08**
 $x + y \leq 30$,
 $y \geq 3$,
 $y \leq 12$,
 $x - y \geq 0$,
 $x \leq 20$,
 $x \geq 0$,
 $y \geq 0$
- Q.2** (a) Explain the engineering classification of hazardous waste. **06**
 (b) Describe Pyrolysis in detail **06**
OR
 (b) What are the options for leachate management in landfills? **06**
- Q.3** (a) Write down short note **08**
 1. Landfilling methods
 2. Landfill gas management
 (b) Describe landfill liners **04**
OR
- Q.3** (a) Which methods are used to estimate waste quantities? Describe material mass balance method in detail. **06**
 (b) Describe unit operations used for separation and processing of solid waste materials at material recovery facilities **06**
- Q.4** (a) Explain process modification as a source reduction process for hazardous waste management. **06**
 (b) With the help of a sketch explain the double composite liner system for landfill. **06**
OR
- Q.4** (a) How can hazardous waste management be achieved by segregation? **06**
 (b) Explain solidification and stabilization as methods of hazardous solid waste disposal **06**
- Q.5** (a) What are the different components of facility for hazardous waste management and disposal facility? **06**
 (b) Describe any one landmark episode of hazardous waste disposal. **06**
OR
- Q.5** (a) What is compatibility of wastes? What should be kept in mind while disposal of wastes? **06**
 (b) List knock down criteria for selection of hazardous waste landfill site. **06**
