Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

VI SEMESTER B.TECH. (CHEMICAL ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL/MAY 2017

SUBJECT: SOLID WASTE ENGINEERING AND MANAGEMENT

Program Elective –III [CHE 4008]

REVISED CREDIT SYSTEM
(29/04/2017)

Time: 3 Hours MAX. MARKS: 100

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A.	Classify the following wastes based on its type and source: (i) Boiler house cinders (ii) Coarse screening grit (iii) Pathological wastes (iv) leather	**4**
1B.	Illustrate the functional elements of solid waste management system with a neat flow diagram.	**4**
1C.	Explain about the designs of larger transfer stations. Also mention the advantages and disadvantages of each design.	**6**
1D.	Discuss about the following: (i) Thermal disposal options available for municipal solid wastes. (ii) Physical characteristics of solid wastes.	**2x3=6**
2A.	Discuss about the microbial degradation process in landfill.	**4**
2B.	Name any four landfill gas emission prediction models.	**2**
2C.	What is the composition of landfill gas? Explain the variation in the composition of landfill gas during the four phases of bacterial decomposition.	**6**
2D.	Explain about various biological and physio-chemical treatment processes that can be employed for the treatment of leachate with a flow diagram.	**8**

3A.	Explain the working principle of the following with a neat sketch. (i) Hammer mills (ii) Optical sorting equipment	**2x4=8**
3B.	Discuss about the functional elements of recycling program.	**6**
3C.	What are the different types of plastics used commercially? Which types of plastics contribute to recycling market and how are they recycled?	**6**
4A.	Explain the chemical processes involved in composting.	**6**
4B.	Discuss about the two types of in-vessel composting system. Which among the two is better for sludge composting industries?	**4**
4C.	Define biogasification. What are all the processes involved in biogasification.	**4**
4D.	Write a short note on two-stage anaerobic digesters with a neat sketch.	**6**
5A.	Explain in detail the mass burning system of incineration with a neat sketch.	**8**
5B.	Discuss about the following with a pictorial representation. (i) Co-generation for energy recovery from incinerators (ii) Electrostatic precipitators	**2x3=6**
5C.	Discuss about the characteristics of hazardous wastes.	**4**
5D.	Name any four options available for the disposal of hazardous wastes by physical and chemical means.	**2**

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