Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (CIVIL ENGINEERING)

END SEMESTER EXAMINATIONS, MAY/JUNE 2016

SUBJECT: SOLID WASTE MANAGEMENT [CIE 324]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE** questions.
- Missing data may be suitable assumed.

1A.	Explain how to determine the settlement of a refuse with necessary equation. Comment on the shear strength behavior of MSW in comparison with soil	**4**
1B.	Explain about transfer station stating its advantages and disadvantages	**2**
1C.	A rear loaded collection vehicle with two crew to service a residential area with 2500 single family dwellings. Determine size of collection vehicle required if travel time to first pick up location and the return time from last pick up location are 0.4 h and 0.3 h respectively. Length of work day is 8 h and off route factor is 0.15. At site time per trip is 0.10 h/trip, and the average solid waste generated is 2.5 Kg/ capita for 3 residents per service location. Collection frequency is once a week for the vehicle with a compaction ratio 2.5. Haul time constants a=0.016 h/trip, b=0.018 h/trip. Round trip haul distance is 35km. Pick up time per location is 1.35 collector-min/location and density of waste is 200 kg/m^3.	**4**
2A.	List the factors to be considered in selection of solid waste collection equipment.	**3**
2B.	Explain operational sequence of a hauled container system with a neat sketch.	**4**
2C.	Explain the various types of ocean waste disposal citing source and effects.	**3**
3A.	Explain briefly the phases of composting and associated microrganisms in each stage with a neat sketch.	**4**
3B.	Explain any four methods to assess the degree of decomposition in a compost mixture.	**4**
3C.	Explain how to prepare a Vermicompost bed with necessary dimensions.	**2**
4A.	With the knowledge you have gained give suggestions or tips for using compost method for agriculture effectively.	**4**
4B.	Explain the importance of various landfill components with a neat sketch.	**4**
4C.	With a neat sketch explain double composite liner system.	**2**

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5A	With a neat schematic diagram explain energy recovery system for a solid waste incinerator	**2**
5B	An electrostatic precipitator having two plates each of length =6 m, width =3 m with air flow rate of 2000 m^3/min and average particle diameter of 1 μm and average particle charge of 10e. Each plate is subjected to an electric field of 50,000 V/m. Calculate the number of plates required to achieve an efficiency of 99%. Viscosity of gas is 1.81×10^{-5} Kg/ms.	**5**
5C	Explain briefly any two methods of control of APC residue in incineration plants	**3**
6A	Explain the various steps in recycling process of plastic waste.	**6**
6B	Explain the significance of various processing equipments in recycling.	**4**