

Total number of printed pages – 6

B. Tech
CPEV 7307

Sixth Semester Examination – 2008

SOLID AND BIO-MEDICAL WASTE MANAGEMENT

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory
and any **five** from the rest.

The figures in the right-hand margin
indicate marks.

1. Briefly answer the following questions : 2×10
 - (i) What is the classification of solid wastes on the basis of its sources ?
 - (ii) A solid waste can be declared as hazardous waste if it exhibits one of the following characteristics



- (a) _____ ; (b) _____ ;
(c) _____ ; (d) _____ .

- (iii) Which are the properties (chemical and other) to be studied if the Municipal solid wastes (MSW) will be used as a fuel.
- (iv) Write the factors that affect the rate of generation of MSW.
- (v) Compare Hauled container collection system with Stationary container collection system used for handling of MSW.
- (vi) Discuss the types of composting used for the treatment of MSW.
- (vii) Write three main advantages of thermal treatment of solid waste.
- (viii) Give the definition of biomedical waste with an example.
- (ix) Briefly discuss the advantages of anaerobic digestion for the treatment of MSW.

P.T.O.

CPEV 7307

2

Contd.

(x) What are the unit operations used for the separation and processing of MSW.

2. (a) Give appropriate examples on each type wastes 4

(i) food waste

(ii) rubbish

(iii) construction wastes

(iv) special wastes

(b) Arrange the following wastes in a sequential (increasing/decreasing) order for each of the given properties i.e
1. Moisture content 2. Density 3. Energy

(i) food wastes

(ii) paper and card board

(iii) plastic

(iv) glass

(v) tin cans

(vi) wood 6

CPEV 7307

3

P.T.O.

3. Solid wastes from a commercial area are to be collected using a stationary container collection system having 4m^3 containers. Determine the appropriate truck capacity for the following conditions : (i) Container size = 4m^3

(ii) Container utilisation factor = 0.75

(iii) Average No. of container at each location = 2

(iv) Collection vehicle compaction ratio = 2.5

(v) Container unloading time = 0.1 hour per container

(vi) Average drive between container locations = 0.1 hour.

(vii) One way haul distance = 30 KM.

(viii) Speed limit = 88 KM/hr

(ix) Time from garage to first container = 0.33 hour

(x) Time from last container to garage = 0.25 hour

(xi) Number of trips to disposal site per day = 2

(xii) Length of work day = 8 hours. 10

CPEV 7307

4

Contd.

4. (a) Explain the source reduction methods with its relative merits and demerits. 5
- (b) Briefly discuss the types of transfer stations and their locations. What are the means and methods of transfer ? 5
5. (a) Describe the different methods of constructing a sanitary land fill and different parameters required to design a landfill. 5
- (b) Define the term leachate and where it is generally occurred. How the gas movement and leachate can be controlled ? 5
6. Give a note on the following types of processing techniques used for the management of solid lid wastes : 10
- (i) Mechanical volume reduction techniques
- (ii) Thermal volume reduction techniques
- (iii) Mechanical size reduction techniques
- (iv) Manual component separation techniques.

7. (a) Explain the procedure of pyrolysis and what are the advantages ? 5
- (b) List the types of incinerators used in the management of solid wastes and what are the corresponding products of incineration in those types. 5
8. Write short notes on the following : 10
- (i) Bio-medical waste
- (ii) Fundamentals of thermal processing
- (iii) Gasification
- (iv) Energy recovery system.