M.E. (CIVIL) SECOND SEMESTER EXAMINATION, 2012-13
SOLID WASTE MANAGEMENT (CE-1020)

Time Allowed: 3 hrs. **Full Marks: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as possible.

Answer Question No. ***1 (ONE)*** *&* ***2 (TWO)*** *and any* ***THREE (3)*** *from the rests.*

1) A town has the present population of 1 lac. Design in step-wise the proper solid waste management programme giving an idea for initial capital cost and annual recurring expenditure for that project. Assume all the reasonable data which are not given. **14**

2) a) On a logical priority basis, state the various hazardous waste management techniques.
   b) Differentiate between waste minimization, waste exchange and recycling.
   c) List and briefly explain the five ways a waste can be found to be hazardous. 5+4+5=**14**

3) a) List the objectives of a waste audit.
   b) Explain the difference between deep well injection and land treatment.
   c) List the most important factors for proper incinerator design and operation. What are the types of incinerators most commonly used for destroying hazardous waste? 5+4+5=**14**

4) a) What factors are to be considered before selection of a potential landfill site?
   b) Briefly discuss the various phases that may occur during the generation of landfill gases.
   c) Explain why leachate occurs and show with sketches how it can be controlled? 4+5+5=**14**

5) a) Categorize the thermal processing system on the basis of their air requirements.
   b) What are the important design considerations for aerobic composting process?
   c) Distinguish between low-solids and high-solids anaerobic digestion process. 5+5+4=**14**

6) a) Schematically show the operational sequences for 'HCS' and 'SCS' system. Explain the term 'break-even time'.
   b) What important factors are to be considered during the design of transfer stations? What are their different types? What are the possible location criteria of a transfer station?
   c) What factors should be considered in laying-out of routes? What are the different steps that are followed during the layout of collection routes? 4+5+5=**14**

7) a) State the various physical and chemical analysis of MSW. What are the basic significances of these analyses?
   b) State the major component fractions resulting from the pyrolysis process. What are the operational problems with MSW pyrolysis system?
   c) List the factors that influence the quality of municipal solid waste generation rates. 5+5+4=**14**
