

(3 Hours)

[Total Marks : 80]

1. Question no one is compulsory.
2. Answer any three from remaining.
3. Assume any additional data if necessary and state it clearly.

14/12/2024

QP-10070441

- Q1** Attempt (Any 4)
- a What are the Heuristic guidelines for laying collection route? 05
 - b Define RDF and manufacturing process of RDF 05
 - c State and explain characteristics of hazardous waste management 05
 - d Write a note on bioreactor landfill 05
 - e Describe 7R principle in solid waste management. 05
- Q2**
- a How do seasonal variations affect the quantity and composition of solid waste? Provide examples of specific waste types that are influenced by seasonal changes. 05
 - b. What are the key factors that influence the rate of composting? 05
 - c. How can educational institutions contribute to solid waste management awareness? Suggest specific activities or programs that can be implemented in schools and colleges. 10
- Q3**
- a Compare the stationary container system with the hauled container system. Draw the both diagrams. 10
 - b Discuss the importance of volume reduction at the source in solid waste management. What techniques can be employed to achieve this? 10
- Q4**
- a Describe the pyrolysis process in waste management, including the temperature range and types of materials that can be processed. What are the main products obtained from pyrolysis? Discuss one advantage of using pyrolysis. 10
 - b Estimate the volume of methane produce by anaerobic digestion of one tone of waste having chemical composition $C_{50}H_{100}O_{50}N_2$ 10
- $$C_aH_bO_cN_d + \left(\frac{4a-b-2c+3d}{4}\right) H_2O \rightarrow \left(\frac{4a+b-2c-3d}{8}\right) CH_4 + \left(\frac{4a-b+2c+3d}{8}\right) CO_2 + dNH_3$$
- Q5**
- a Explain colour coding of Biomedical waste. 05
 - b. How would you apply environmentally sustainable practices to improve biomedical waste disposal, processes in hospital while ensuring compliance with local regulations? 05
 - c If you are tasked with managing a landfill that is nearing capacity, outline the steps you would take for effective landfill closure. What design considerations and environmental safeguards would you implement? 10
- Q6**
- a Propose a method to increase e-waste collection rates in a city with low awareness about e-waste disposal. 05
 - b. Estimate Energy content by using Modified Dulong's formula for $C_{60}H_{100}O_{35}N_2S_1$ 05
 - c. Estimate the number of trips taken by the truck per week to collect the waste of the society having 250 residents. Assume the following data given below: 10
- Occupants per residence = 3.5
Solid waste generation rate = 1.45 kg/person/day
Collection vehicle capacity = 20 m³
Compacted density of solid waste in collection vehicles = 325 kg/m³

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