

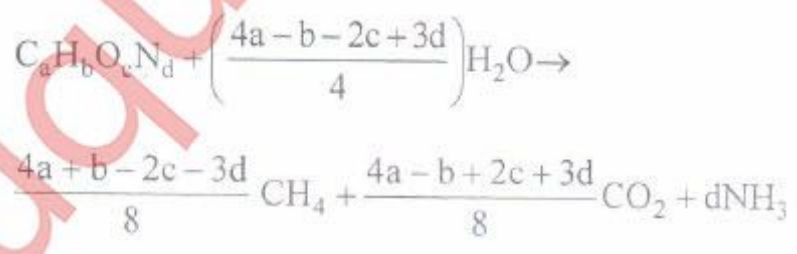
- N. B. : (1) Question No. 1 is compulsory.
 (2) Solve any **three** questions out of remaining **five** questions.
 (3) Assume suitable data if necessary.
 (4) All questions carry **equal** marks.

1. (a) Explain the functional elements of municipal solid waste management. **5**
 (b) Estimate the moisture content of municipal solid waste sample with the following composition. **5**

Component	% by mass	moisture content %
Food waste	20	70
Paper	40	6
Card board	10	5
Plastics	10	2
Garden Trimmings	10	60
Wood	5	20
Tin cans	5	3

- (c) Explain the sources of municipal solid waste. **5**
 (d) Write a note on E-waste. **5**
2. (a) Explain the physical and chemical characteristics of municipal solid waste. **10**
 (b) Explain the importance of re-use and recycling in context to solid waste management. **5**
 (c) Why transfer stations are necessary? What are the various types. **5**

3. (a) Estimate the theoretical volume of methane gas that could be expected from the anaerobic digestion of a tonne of waste having the composition $C_{55} H_{110} O_{35} N_1$ **10**



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(b) What is landfill? Explain the types of landfill with neat sketch. 10

4. Write short notes on any four :- 20

- (a) Pyrolysis
- (b) Hazardous waste
- (c) Sampling of solid waste
- (d) Incinerator
- (e) Legal aspects of solid waste disposal
- (f) Segregation

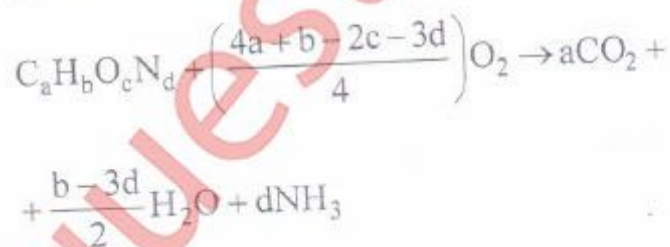
5. (a) Write in brief about Bio-medical waste management. 6

(b) Calculate the energy content of solid waste having following composition using modified dulong's formula 6

Component	% by mass
Carbon	36.3
Hydrogen	7.3
Oxygen	51.1
Nitrogen	0.5
Sulphur	0.1
Ash	4.7

(c) With the help of neat sketch explain the hauled container system. 8

6. (a) Determine the amount of air required to oxidise completely 1 tonne of waste having chemical equation $C_{50}H_{100}O_{40}N$ 10



(b) Explain house to house collection method of solid waste management. 5

(c) What are the factors which affects the composting process. 5