

(Time: 3Hours)

Max Marks: 80

N.B. 1. Question No.1 is compulsory

2. Attempt any **three** questions from remaining **five** questions.
3. Assume any suitable data where ever required.
4. Figures to the right indicate full marks.

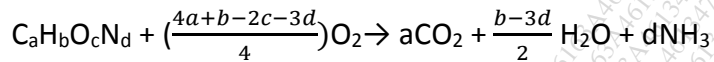
Q.1 Attempt any **four**

- a. What is optimization of routes? **05**
- b. Determine the number of 7.5m^3 containers required per week for waste collection after compaction, for a colony with 200 houses, 3 people per house. The generation rate is 0.6kg/person/day . The compacted specific weight is 250kg/m^3 . **05**
- c. Explain sampling of solid waste. **05**
- d. Draw neat sketch of 'Conventional mode of Hauled Container System' **05**
- e. What is toxicity testing? How is it carried out for hazardous waste? **05**

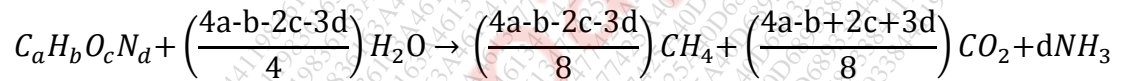
- Q.2**
- a. Explain Hospital solid waste with **10**
 - 1) Categories of waste
 - 2) Quantities and composition
 - 3) Storage
 - 4) Transportation
 - 5) Treatment and Disposal
 - b. Estimate the energy value of typical residential Municipal Solid waste with the average composition $\text{C}_{760}\text{H}_{1980}\text{O}_{875}\text{N}_{13}\text{S}_1$. **10**

- Q.3**
- a. What is Sanitary landfilling? Explain the recovery of gas from sanitary landfill. **10**
 - b. Define composting. What are the various considerations to achieve composting efficiency maximum. **10**

- Q.4** a. Explain physical, Chemical and Biological transformation in solid waste management **10**
 .Also write down the importance of waste transformation.
- b. Determine the amount of air required to oxidize one tonne of waste with the chemical **10**
 composition $C_{60}H_{90}O_{30}N_1$.



- Q.5** a. Explain with diagram working of Municipal Incinerator. Also explain air pollution **10**
 control measures adopted in Incinerators.
- b. Estimate the theoretical volume of methane gas that could be expected from anaerobic **10**
 digestion of one tonne of waste having the composition of $C_{45}H_{90}O_{35}N_1$.



- Q.6** Write short note on **any four** **20**
- E-waste management
 - Plastic waste management
 - Pyrolysis
 - Legal aspect of solid waste Disposal
 - Significance of chemical properties of solid waste
