BE(CIVIL) | sem VII | S&H WM | R-19 Cscheme | 10/06/2

(3Hours) Max Marks=80

Note 1. Question No.1 is compulsory
2. Attempt any three questions from remaining questions.
3. Assume any suitable data where ever required.
4. Figures to the right indicate full marks.

Q.1 Attempt any **four**

a. Explain with neat sketch 'Hauled Container System' 05

b. Estimate density of solid waste sample from the given data. 05

Components	% by weight	Typical density(kg/m3)
Food waste	30	290
Glass	5	195
plastic	15	65
Paper	30	85
Wood	13	240
Ferrous Metal	5	320
Miscellaneous	2	240

c. What is landfill? Explain any one type. 05

d. Explain the term 'colour coding' as is used in relation to the biomedical wastes, and how does it help on safe disposal of bio-medical wastes? 05

e. What is called as optimization of collection route? 05

Q.2 a. Estimate the theoretical volume of methane gas that could be expected from anaerobic digestion of one tonne of waste having the composition of $C_{55}H_{110}O_{35}N_1$. 10

$$C_aH_bO_cN_d + \left(\frac{4a-b-2c-3d}{4}\right) H_2O \rightarrow \left(\frac{4a-b-2c-3d}{8}\right) CH_4 + \left(\frac{4a-b+2c+3d}{8}\right) CO_2 + dNH_3$$

b. Explain physical, chemical and Biological transformation of solid waste. 10

Q.3 a. Explain the working of municipal incinerator with neat sketch. Explain the air pollution control measures adopted in conjunction with incinerator. 10

b. What is Leachate? How it is formed? How its movement is controlled? 10

Q.P. Code :- 87330

Program Code : 1T00637

Q.4 a. What are the different characteristics of hazardous waste? How such a waste stored, transported and disposed. 10

b. Estimate the energy content of solid waste (on dry basis and ash free dry basis) with the following composition is given in a table below. 10

Components	% by Mass	Energy KJ/Kg
Food wastes	35	4650
Paper	15	16750
Cardboard	5	16300
Plastics	10	32600
Garden Trimmings	20	6500
Wood	12	18600
Tin Cans	3	700

Q.5 a. Determine the amount of air required to oxidize one tonne of waste with the chemical composition $C_{50}H_{100}O_{40}N_2$. 10

$$C_aH_bO_cN_d + \left(\frac{4a+b-2c-3d}{4}\right)O_2 \rightarrow aCO_2 + \frac{b-3d}{2}H_2O + dNH_3$$

b. Describe the various methods of construction and demolition waste management, including recycling, reuse, and disposal, and explain the advantages and challenges associated with each approach. 10

Q.6 Write short note on **any four** 20

a. IOT in SWM
b. Vermi composting
c. E-waste management
d. Legal issues related to solid waste disposal
e. Transfer station

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