

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

CLASS: MTech/Phd
BRANCH: ESE/RS

SEMESTER : II/I
SESSION : SP/22

SUBJECT: CE534 SOLID WASTE MANAGEMENT

TIME: 2 HOURS

FULL MARKS: 50

- Q.1(a) A residential area consisting of 1500 houses and has 4 residents per house. Estimate the total quantity of solid waste generated for 1 week for the following observations and the unit rate of solid waste generation: [5]

Type of Vehicle	No. of Trips	Volume (Cub m)	Specific Weight (Kg/cub m)
I	10	15	300
II	8	2	150
III	25	0.5	100

- Q.1(b) Solid waste from a new industrial park is to be collected in large containers using stationary compactors. It is estimated that the average time to drive from garage to first container (t_1) and from last container (t_2) to garage each day is 15 and 20min respectively. The average time spent between containers is 6min and the one way distance to disposal site is 25km (speed limit: 88km/h). Determine the number of containers that can be emptied per day based on 8hr workday. Assume the following: $p_c + u_c = 0.4$ h/trip; $d_{bc} = 0.1$ h/trip; $s = 0.133$; $a = 0.016$; $b = 0.011$; $W = 0.15$, $H = 8$. [5]

- Q.2(a) Elaborate the functional elements of solid waste management. [5]
Q.2(b) Discuss the physical and chemical properties of solid waste [5]

- Q.3(a) Compare Incineration process and pyrolysis process [5]
Q.3(b) Discuss the techniques involved in Density Separation [5]

- Q.4(a) What are the important considerations for Landfill site selection [5]
Q.4(b) Which processes are involved in Leachate treatment? Elaborate any two processes [5]

- Q.5(a) Prepare a comparative table to show the environmental aspect, impact and mitigations measures related to cement Industries [5]
Q.5(b) Using any case studies discuss the waste management plan for any industry except cement. [5]

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