

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

T3 - EXAMINATION (December - 2018)

B.Tech. (VII – SEM)

COURSE CODE: 14M31CE115

MAX. MARKS: 35

COURSE NAME: Solid Waste Management

COURSE CREDIT: 3

MAX. TIME: 2 HRS

Note: Attempt all questions. Assume suitable data if required. Carrying of mobile phone during examinations will be treated as case of unfair means

1. Estimate the moisture content (wet and dry basis) and as-discarded density of the following solid waste:

(3+3) [CO 1 & 2]

Component	Mass (%)	Moisture (%)	Density (Kg/m ³)
Newspaper	15	6	85
Other papers	24	6	85
Cardboards	33	5	50
Glass	4.2	0.5	195
Plastics	0.49	2	65
Aluminum	0.13	0.5	160
Ferrous	1.18	0.5	320
Non-Ferrous	0.35	0.5	160
Yard Wastes	17.97	60	105
Food Wastes	1.67	60	290
Dirt	2.01	8	480

2. Explain with the help of a well labeled diagram the integrated solid waste management? (3) [CO 7]
3. List the stages of LCA? [CO 8 & 6] (5)
4. Write short notes on some of the harmful gases emitted during the incineration process and also some of the gas cleaning equipment used? [CO 5] (3)
5. Briefly explain the identification and classification of hazardous waste? [CO 8] (5)
6. (a) Solid wastes from a commercial area are to be collected using a stationary- container collection system having 4 m³ containers. Determine the appropriate truck capacity for the following conditions:

[CO 3 & 4]

(a) Container Size= 4 m³

(b) Container utilization Factor= 0.75

(c) Average number of containers at each location= 2

- (d) Collection- Vehicle compaction ratio= 2.5
- (e) Container Unloading Time= 0.1 h/ container
- (f) Average drive time between container locations= 0.1 h
- (g) One-Way Haul Distance= 30 Km
- (h) Speed Limit= 88 Km/h (55 mi/h)
- (i) Time from Garage to First Container Location= 0.33 h
- (j) Time from Last Container Location to Garage = 0.25 h
- (k) Number of Trips to Disposal Site per day= 2
- (l) Length of Workday= 8 h; $W=0.15$; $s=0.1$ h/trip'; $a=0.016$; $b=0.011$ (3)

(b) Solid wastes from a commercial area are to be collected using a hauled-container collection system having 3.0m^3 containers. Determine the appropriate truck capacity for the following conditions:

1. Container size= 3 m^3
2. Container utilization factor= 0.62
3. Average number of containers at each location=2
4. Collection- vehicle compaction ratio= 2.2
5. Container unloading time=0.2h/container
6. Average drive time between container locations= 0.2 h
7. One-way haul distance=50km
8. Speed limit=88km/h (55mi/h); $s=0.1$ h/trip; $a=0.016$; $b=0.011$
9. Time from garage to first container location= 25 min
10. Time from last location to garage= 30 min
11. Number of trips to the disposal site per day=3
12. Length of the workday=8h (3)

7. (a) In the context of collection system, explain the concept of (a) Hauled container system and (b) Stationary Container System. Explain with neat mathematical expressions? [CO 7] (3.5)

(b) With neat sketches, where appropriate, explain the treatment of hazardous waste using physical and chemical means. Also enumerate the reasons when you would opt for either of the treatment process? [CO 8] (3.5)