

Seat  
No.

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DAI1352

## Environmental Engineering - II (New) (1240)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** questions from each unit.
5. Assume suitable data if necessary.

### UNIT - I

1. a) Briefly explain physical characteristics of sewage. **10**  
b) Define BOD, COD, TOD, population equivalent & limitations of BOD test. **10**  
c) Find out location & magnitude of critical D.O. deficit if  $2\text{m}^3/\text{s}$  of sewage is discharged into river whose flow is  $15\text{m}^3/\text{sec}$  having velocity  $3.5\text{kmph}$  Temp. of w/w is  $20^\circ\text{C}$  & that of river is  $15^\circ\text{C}$  BOD<sub>5</sub>(20) of waste water is  $250\text{ ppm}$  & that river is  $1\text{ ppm}$  w/w contain no D. O. & river is  $90\%$  saturated upstream of discharge At  $20^\circ\text{C}$   $K^1 = 0.3/\text{day}$  &  $K^1_2 = 0.7/\text{day}$  &  $\theta_1 = 1.135$  &  $\theta_2 = 1.024$ .  
D. O. saturation level at  $15^\circ\text{C} = 10.15\text{ ppm}$ . at  $16^\circ\text{C} = 9.95\text{ ppm}$ .

### UNIT - II

2. a) Design combined sewer to serve Area =  $150\text{ha}$ . Population =  $300\text{ per /ha}$ . maximum velocity =  $4\text{ m/s}$ . storm duration =  $30\text{ min}$ . w/s rate =  $300/\text{pcd}$ .

Typeal area	Forest	Open ground	Lawn	Gravel Road	Water tight roof surface
% area	7	22	6	15	50
coeff %	0.12	0.21	0.24	0.62	0.87

- b) Briefly explain structural loads on sewer & maintance of sewer. **10**  
c) Briefly explain manhole & inverted siphon. **10**

**UNIT - III**

3. a) Design coarse & medium screen for peak average flow 60 MLD. 10
- b) Briefly explain comminutors & grit chamber. 10
- c) Design S. T. to treat water 5 MLD. 10

**UNIT - IV**

4. a) Design conventional ASP to treat sewage for population 1.2 lakh with per capita sewage contribution 160 / pcd settled sewage has  $BOD_5 = 200\text{mg/lit}$  & effluent  $BOD_5$  required is 15 mg/lit.  $F/M = 0.2$  MLSS = 3000 mg/lit. SV1 = 100 & air needed is  $100\text{m}^3/\text{day}$  per kg BOD removed. 10
- b) Design circular trickling filter & rotary distribution to treat flow 5 MLD with BOD 150 mg / lit. 10
- c) Briefly explain stabilization ponds. 10

**UNIT - V**

5. a) Briefly explain type & source of solid waste. 10
- b) Briefly explain volume reduction, recovery & Disposal of solid waste. 10
- c) Solid waste from commercial area are to be collected using stationary container collection system having  $4\text{m}^3$  containers. Determine appropriate truck capacity. 10
- a) Container size =  $4\text{m}^3$ .
- b) Container utilization factor = 0.75
- c) Average no. 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 location = 0.1h.
- g) One way haul distance = 30 km.
- h) Speed limit = 88km/h.
- i) Time from garage to 1<sup>st</sup> container location = 0.33h
- j) Time from garage to last container location = 0.25h.
- k) No. of trips to disposal site / day = 2
- l) Length of the work day = 8 h.

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