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B – 2526

Reg. No. :

Name :

**Eighth Semester B.Tech. Degree Examination, December 2016
(2008 Scheme)**

08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time : 3 Hours

Max. Marks : 100

- Instructions:** 1) Answer **all** questions.
2) Assume **any** suitable data if **necessary**.

PART – A

1. Explain the rational formula for the design of drains draining Indian catchments.
2. Define an inverted siphon. What are the points should be kept in mind while designing these inverted siphons ?
3. Explain population equivalent and relative stability.
4. With a neat sketch explain a contact bed used in waste water treatment.
5. What is self cleansing velocity ? How it is determined ?
6. Explain principles of house drainage.
7. With a neat sketch explain the mechanism of working of a stabilisation pond.
8. The moisture content of a sludge is reduced from 95 to 90% in a sludge digestion tank. Find the percentage decrease in the volume of sludge. **(8×5=40 Marks)**

PART – B

Module – I

9. a) Define dry weather flow. Explain the factors affecting the dry weather flow. **10**
b) With a neat sketch explain the component parts of a manhole. **10**

OR

P.T.O.



10. a) What do you understand by self purification property of a stream ? Explain the factors affecting this property. 8
- b) A waste water treatment plant disposes off its effluent into a stream at a point 'A'. Characteristics of the stream at a location fairly upstream of 'A' and of the effluent are as follows :

Item	Units	Effluent	Stream
Flow	m ³ /sec.	0.20	0.5
Dissolved oxygen	mg/l	2	8
Temperature	°C	26	22
BOD ₅ at 20°C	mg/l	40	3

Assume that the deoxygenation constant K_1 at 20 °C (base e) = 0.2/day and the reaeration constant K_2 at 20 °C (base e) = 0.4/day for the mixture equilibrium concentration of dissolved oxygen. C_s for the fresh water is as follows

Temperature (°C)	18	20	22	23	24	25	26
C_s (mg/l)	9.54	9.17	8.99	8.83	8.53	8.38	8.22

The velocity of stream downstream of the point A is 0.2 m/sec. Determine the critical oxygen deficit and its location. Use temperature co-efficients of 1.04 for K_1 and 1.02 for K_2 . 12

Module – II

11. a) Determine the size of a high rate trickling filter for the following data :

Sewage flow = 5 MLD

Recirculation ratio = 1.4

BOD of raw sewage = 260 mg/l

BOD removal in primary clarifier = 30%

Final effluent BOD desired = 40 mg/l 10

- b) What are the various methods by which the effluent from a septic tank can be disposed ? Explain any one method in detail. 10

OR



12. a) What is meant by activated sludge ? Describe with sketches the treatment of sewage by activated sludge process. 12
- b) The MLSS concentration in an aeration tank of activated sludge process is 2500 mg/l and the sludge volume after 30 minutes of settling in a 1000 ml graduated cylinders is 180 ml. Determine sludge volume index and return sludge ratio required. 8

Module – III

13. a) Design an oxidation pond to treat the sewage from a city whose population is 50000 and water supply is 200 l/capita/day. 10
- b) What do you understand by sludge thickening ? Enumerate various methods. Explain any one method. 10

OR

14. a) Develop a relation between the diameter of circular section of a drain and a side of a rectangular section having width as twice its depth. The rectangular drain is open from the top. 10
- b) Design a sludge digestion tank for 50000 people. The sludge content per capita per day is 0.068 kg. The moisture of the sludge is 94%, the specific gravity of the wet sludge is 1.02 and 3% of the digester volume is daily filled with the fresh sludge, which is mixed with the digested sludge. 10