



B.E. / B.Tech. (Part-time) DEGREE END SEMESTER EXAMINATIONS, NOV/DEC 2013
CIVIL ENGINEERING BRANCH
FIFTH SEMESTER

PTCE 384 ENVIRONMENTAL ENGINEERING –II /
PTCE 339/ PTCE 9354 WASTE WATER ENGINEERING

(REGULATIONS: 2002/2005/2009)

Time: 3 hours

Answer All Questions

Max. Marks: 100

Instructions

- (i) Part A carries a maximum of 20 marks and Part B carries a maximum of 80 marks
- (ii) All questions in Part A carries 2 marks each and all questions in Part B carries 16 marks each
- (iii) Make suitable assumptions wherever necessary and state them clearly.

PART A (10X2 = 20 Marks)

1. What is the significance of temperature in BOD reaction?
2. How do you estimate storm water runoff while designing storm water drain?
3. What is the need for manhole in sewerage system?
4. Under what circumstances pumping is required for sewerage system?
5. Distinguish between discrete and flocculent settling.
6. What are the objectives of screening?
7. Distinguish between aerobic pond and anaerobic pond.
8. What is the purpose of GLSS in UASB reactor?
9. A town discharges $50 \text{ m}^3/\text{s}$ of secondary treated sewage into a stream having a rate of flow $1000 \text{ m}^3/\text{s}$. The DO content of sewage is 0.5 mg/L and DO in upstream side of river is 8.5 mg/L . Find the DO of mix.
10. Enumerate various methods of sludge dewatering.

PART B (5X16 = 80 Marks)

11. Briefly describe the various physico-chemical characteristics of sewage and state their environmental significance.
- 12.a) Explain various systems of sanitary plumbing and write down their main characteristics.

(OR)

12.b) Briefly explain the various factors to be considered in the design of sewerage system. Design a sanitary sewer to a population of 7000 receiving water at 90 Lpcd. Minimum self cleansing velocity at design flow is 0.8 m/s, maximum depth of flow is 0.5D. Assume other design criteria as applicable.

13.a) Assuming suitable criteria design a grit channel for a proposed STP expected to treat 60 ML/d maximum flow. Draw a neat sketch of the unit.

(OR)

b) Design a septic tank with neat sketch for a hostel having 150 students. Design sewage flow is 70 Lpcd. Desludging period is one year. What would be the size of the dispersion trench, if the effluent from the septic tank is to be discharged in it?

14.a) i) Explain the working principle of an oxidation ditch with a neat sketch. (8)

ii) Design a high rate trickling filter from the following data:

Design flow	:	40 ML/d	
Recirculation ratio	:	1.9	
BOD ₅ of primary treated sewage	:	220 mg/L	
Desirable effluent BOD ₅	:	20 mg/L	(8)

(OR)

b) Draw the typical process flow diagram for a conventional ASP based secondary treatment process and explain the working principle of the system.

15.a) What do you mean by "Self purification" of stream? Draw a neat sketch of an oxygen sag curve and explain the salient features.

(OR)

b) Draw a neat sketch of a high rate two-stage anaerobic sludge digester and explain its salient features. Briefly outline the procedure to calculate the volume of the digester.
