Printed Pages: **EEV-801**

(Following Paper ID and Roll No. to be filled in your Answer Books)	
Paper ID : 197801	**Roll No.**

B. TECH.

Theory Examination (Semester-VIII) 2015-16

DESIGN OF WASTE WATER SYSTEM

Time : 3 Hours ***Max. Marks : 100***

Section-A

Q1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)

(a) Write short notes on sludge recycling.

(b) What is the scope of design of waste water systems?

(c) What is the significance of sludge solid retention time in ASP design?

(d) What is F/M ralio?

(e) Give the NRC formula for fixing the volume of trick-ling filters.

(f) What is meant by recirculation ratio?

(g) Discuss the advantages and disadvantages of oxidation pond.

(h) What is the operational principle of Waste stabilization ponds?

(i) What are the different types of thickener unit?

(j) Write short note on ripened sludge.

Section-B

Q2. Attempt any 5 questions from this section. (10×5=50)

(a) Discuss about the design of reactor with the process flow sheets.

(b) Write short notes on :

(i) Sludge Volume Index

(ii) Nutritional Requirement

(iii) Hydraulic loading rate

(iv) Percolation rate

(v) Sludge conditioning

(c) An activated sludge plant with mixed liquor volatile suspended solids (MLVSS) as 2000 mg /*l* treats with an ultimate BOD of 900 mg/l and 300 mg/*l* VSS which are 86% biodegradable. If the plant effluent contains 20 mg/*l* ultimate BOD and 15 mg/*l* VSS. Determine the daily VSS accumulation and the oxygen requirement for a flow of 0.40 m^3/s. Take synthesis constant P as 0.55 and the endogenous respiration constant q as 0.15.

(d) Distinguish between Standard rate filters and high rate filters.

(e) Design an oxidation ditch for a community of 7500 with a percapita sewage contribution of 90 lpcd and BOD of the treated sewage is 30 mg/l.

(f) Explain the theory involved in aerated lagoons.

(g) Discuss the need for dewatering and explain the various sludge dewatering methods.

(h) Briefly explain the working principle of Rotating biological contractors.

Section-C

Note: Attempt any 2 questions from this section. (15×2=30)

Q3. (a) Explain the components and operational principles of an activated sludge process.

(b) Determine the surface area of low rate trickling filter to treat 10 MLD of average sewage flow with a BOD of 300 mg/l at an organic loading rate of 0.2 kg BOD/m^3/ day.

Q4. Explain in detail about the working principle of waste stabilization ponds. Mention their classification.

Q5. (a) With the help of flow chart explain various process involved in sludge treatment and disposal. Explain the mechanism of anaerobic and aerobic sludge digestion with their relative merits and demerits.

(b) What is sewage farming? List the methods and state its advantages over the method of disposal of sewage dilution.