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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION- JUNE -2016

B.Tech VI Semester

COURSE CODE: 10B11CE613 MAX. MARKS: 35

COURSE NAME: SEWAGE TREATMENT AND DISPOSAL

COURSE CREDITS: 04 MAX. TIME: 2 HRS

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data wherever required and not provided.*

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1. A combined sewer of circular cross section is to be laid to serve an area of 100 hectares with a population of 90000, supplied with water @200 l/day. Assuming an impermeability factor of 0.5 and time of concentration of rainfall as 20 minutes, calculate the size of sewer when it has to run full with a velocity of 0.3m/sec. **(3)**

2.(a)Determine the dimensions of a high rate trickling filter for the following data:

Sewage flow:3 MLD
Recirculation ratio=1.5
BOD of raw sewage=250 mg/l
BOD removal in primary tank=25%
Final effluent BOD desired=30 mg/l

(b) By what % the diameter of the filter have to be modified if it is to be designed as a standard rate trickling filter. **(3+2)**

3.A combined sewer of circular cross section is to be laid to serve an area of 100 hectares with a population of 90000, supplied with water @200 l/day. Assuming an impermeability factor of 0.5 and time of concentration of rainfall as 20 minutes, calculate the size of sewer when it has to run full with a velocity of 0.3m/sec. **(3)**

4.Design a complete mix activated sludge process aeration tank for treatment of 3 MLD of sewage having BOD concentration 150 mg/l. The yielding effluent BOD should not exceed 20 mg/l. Consider 80% of MLSS as volatile and MLVSS in the aeration tank as 3000 mg/l. The return sludge SS concentration is 9000 mg/l. Adopt mean cell residence time as 9 days. **(8)**

5. Design a SST for treatment of 10MLD effluent coming from an conventional ASP system. Assume that the MLSS concentration is 4000mg/l and a peak factor of 2.5. Assume suitable design parameters for design. **(4)**

6. A small community has a population of 100 persons with an assumed water supply of 150 l/c/d. BOD of the generated wastewater from community is 100 mg/l. Design the most suitable treatment system for the community (without the use of any power supply unit). **(4)**

7. Write short notes on the following: **(8)**

(a) Flow Diagram of Nitrification and Denitrification of sewage
(b) Sludge Thickening
(c) Egg and horse shoe shaped sewers
(d) Operational troubles in RBC