

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – WINTER 2013****Subject Code: 160604****Date: 06-12-2013****Subject Name: Water and Waste Water Engineering****Time: 02:30 pm to 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Describe various type of water carriage systems in brief with advantages and disadvantages. **07**
- (b) Explain the variation in sewage flow. **07**
- Q.2** (a) Differentiate between self cleaning velocity and limiting velocity in sewers and derive an expression for the self cleaning velocity. **07**
- (b) Find the minimum velocity and gradient required to transport coarse sand through a sewer of 90 cm dia with sand particles of 1mm dia and specific gravity 2.66. Take $\beta = 0.06$, $N = 0.012$, and $f = 0.02$. Assume the sewer to run half full. **07**
- OR**
- (b) Describe the procedure of laying and testing of sewers. **07**
- Q.3** (a) Explain the cycle of decomposition. **07**
- (b) Determine the size of a high rate trickling filter for the following data : **07**
- (i) Sewage flow is 10 MLD
- (ii) Recirculation ratio is 1.5
- (iii) BOD of raw sewage is 230 mg/l
- (iv) BOD removal in primary clarifier is 30 % and
- (v) Final effluent BOD desired is 25 mg/l
- OR**
- Q.3** (a) Water is to be supplied to a town of 2.5 lakh population from a source 2.0 km away. Per capita demand of the town is 200 litres/day/capita. If the town is situated at a higher level than the source and the difference in elevation between the lowest water in the source to the point of inlet at the water work is 30 m. Determine the size of the rising main and H.P. of the pump. The value of the CH(Coeff. of Hazen-William's) is 110 and the pump works for 18 hours. **07**
- (b) Explain design criteria of the grit chamber. **07**
- Q.4** (a) Explain water distribution systems in brief with sketches. **07**
- (b) What is difference between USR and ESR? Explain how the storage capacity of the ESR is determined. **07**
- OR**
- Q.4** (a) Write a short note on a analysis of complex pipe network of water distribution system. **07**
- (b) Define super chlorination, dechlorination, plain chlorination , post chlorination and brake point chlorination. **07**
- Q.5** (a) What are the different types of filters? Explain each in brief. **07**
- (b) Explain the factors affecting the water demand. **07**
- OR**
- Q.5** (a) What are the various types of intake works? Describe a river intake with help of neat sketch. **07**
- (b) Design a septic tank for a hostel building of 100 students Also design the soil absorption system for the disposal of the septic tank effluent, assuming the percolation rate as 20 minutes per cm. Also assume peak discharge is 240 lpm **07**

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