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GUJARAT TECHNOLOGICAL UNIVERSITY ME - SEMESTER–I(New course)• EXAMINATION – WINTER- 2015

Su Su Tii Inst	Subject Code: 2711701Date: 31/12/2Subject Name: Application Based Systems for Transport of Water & WastewaterTime: 2:30 pm to 5:00 pmInstructions:		015 : 70	
Inst	1. 2. 3.	 Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. 		
Q.1	(a)	In an incompressible flow, the velocity vector is given by $V = (6xt + yz^2) I + (3t + xy^2) j + (xy - 2xyz - 6tz) k$ (i) Verify whether the continuity equation is satisfied.	07	
	(b)	(ii) Determine the acceleration vector at point L $(2, 2, 2)$ at t = 2.0. Enlist minor energy losses in pipe flow with their formula.	07	
Q.2	(a) (b)	Explain reciprocating pumps in detail. What are the various methods of conveyance of water ? Describe.	07 07	
	(b)	Write short note on the laying of pipes.	07	
Q.3	(a) (b)	Write short note on dead end system with neat sketch. Determine the sizes of the pipes in the network given in fig. (1). The average water is to be supplied at 200 litres/day /capita. The maximum rate of supply is 2.7 times the average demand.	07 07	
		OR		
Q.3	(a) (b)	Enlist methods of Water distribution and explain any one in detail. Explain types of reservoirs in details.	07 07	
Q.4	(a)	 If a rectangular sedimentation tank is treating 2.5 X 10⁶ lit/day. The size of tank is 17.5 X 5.5 X 3.5 if 80 ppm suspended solids are present in the water assuming the 75% removal in the basin and the the average specific gravity as 2.0 determine the following: a) Average flow of water through tank b) Detention time c) Deposition of solids in the tank 	07	
		d) Overflow rate		
	(b)	Explain manholes in detail with neat sketch. OR	07	
Q.4	(a)	Design a bell mouth canal intake for a city of 70000 persons drawing water from a canal which runs only for 10 hours a day with a depth of 1.6 m. Also calculate the head loss in the intake conduit if the treatment plant is 0.5 km away, assume average consumption per person 160 liter/day, assume the velocity through the screens and bell mouth to be 0.15 m/sec and 0.3 m/sec	07	

- (b) For a circular sewer and a rectangular sewer to be hydraulically equivalent, 07 find the relation between the depth of the rectangular sewer and the diameter of the circular sewer. Take the width of rectangular sewer as twice its depth and assume that only three sides of the rectangular sewer are wetted.
- **Q.5** (a) Explain the rational Method?
 - (b) Assuming the surface on which rainfall in a thickly built up residential district 07 as follows: 60% of the area consists of roofs and pavements (c₁=0.70), 40% of the area consists of lawns and gardens (c₂=0.30) calculate the co efficient of runoff. If the total area of district is 4 hectares and the maximum intensity of rain is taken as 40 mm/hr what is total runoff of the district?

OR

- Q.5 (a) Discuss factors affecting on storm Sewage.
 - (b) Explain rainfall intensity curves in detail.





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