END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] MAY-JUNE-2015

Paper Code: ETCE 202	
Time : 3 Hours	Subject: Water Engineering
	Maximum Marks :75

Note: Attempt any five questions including Q.No. 1 which is compulsory. Select one question from each unit.

Q1. (a) What are the effects of variations of demand on the design capacities of different components of a water supply scheme? **(5)**

(b) A water sample is alkaline to both phelophthalein as well as methyl orange. 100mL of water sample on titration with N/50 HCl required 6.8mL of acid up to phenolphthalein end point. When a few drops of methyl orange are added to the same solution and titration further continued, the yellow colour of the solution just turned red after addition of another 12.6mL of acid solution. Elucidate the type and extent of alkalinity present in water sample. **(5)**

(c) What is the method adopted for detecting the presence of coliform bacteria? What do you mean by MPN? **(5)**

(d) Write a note on backwashing of rapid gravity filters. **(5)**

(e) Distinguish between Centrifugal and Reciprocating pumps. What are the components of a sewage pumping station? **(5)**

Unit-I

Q2. (a) Determine the future population of a satellite town by Geometric increase method for the year 2011, given the following data: **(6)**

Year	Population in thousand
1951	93
1961	111
1971	132
1981	171
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2011	?

(b) How can dissolved chloride content be estimated? **(6.5)**

Q3. (a) What are the types of solids present in a water sample? How can we estimate the content of solids? **(6.5)**

(b) 700 m3/day of water is to be obtained from a proposed infiltration gallery, which is placed at 7m depth from sub-surface water table. The coefficient of permeability of soil aquifer is 100m/day. Find the length of the gallery if the drawdown in the gallery on pumping is not to exceed 4m. The radius of influence may be assumed to be 100m. **(6)**

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Unit-II

Q4. (a) Explain the Streeter Phelps model for Dissolved oxygen. **(6.5)**

(b) What is the effect of temperature and mixing intensity on Oxygen transfer? **(6)**

Q5. (a) Estimate the quantity and quality of waste stream and the total quantity of water that must be processed, from a reverse osmosis facility that is to produce $500m^3/d$ of water to be used for industrial cooling operations. Assume that both the recovery and rejection rates are equal to 90% and the concentration of feed stream is $400g/m^3$. **(8)**

(b) Distinguish between Slow and Rapid sand filters. **(4.5)**

Unit-III

Q6. (a) What is meant by Short circuiting of a sedimentation tank? How to overcome this phenomenon? **(6.5)**

(b) What are the benefits of using aeration in a treatment plant? Write a note on Cascade aerators. **(6)**

Q7. (a) What are the economic considerations to be kept in mind while designing water works system? **(6)**

(b) State some merits and demerits of coagulation process in sewage treatment. **(6.5)**

Unit-IV

Q8. (a) Draw a neat labeled diagram of the brake point chlorination curve. What are the guidelines for addition of chlorine to drinking water? **(6)**

(b) What are membrane bioreactors? What are the advantages of BMRs over activated sludge process? **(6.5)**

Q9. (a) Which type of distribution network is used in Chandigarh? What are the various advantages and disadvantages of such distribution network? **(6)**

(b) Explain the principle used in EPANET software for analysis of water distribution networks. **(6.5)**

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