Roll No ....

MTEE - 201
M.E./M.Tech., II Semester
Examination, December 2015
Water Treatment - II

Time : Three Hours

Maximum Marks : 70

Note : i) Solve any five questions.

ii) State and assume any data if required.

1. a) Enlist the criteria of a good disinfectant. What are the factors affecting efficiency of disinfection? Discuss any three in details.

   b) Show that 50% each of hypochlorous acid and hypochlorite ions exist at pH 7.5 when chlorine is added to water during chlorination.

2. Explain the following:
   i) Break point chlorination
   ii) O.T and O.T.A method
   iii) Ozonisation

3. a) Differentiate between physical and chemical adsorption. Explain the batch and continuous adsorption systems.

   b) Explain pore diffusion and surface diffusion. How rate limiting step can be determined during adsorption-study?

4. a) The following laboratory data were collected in a batch adsorption study. Plot the data according to the Freundlich isotherm and determine values of constants n and k.

Flask no.	Wt.of carbon (mg)	Volume in flask (ml)	Final equilibrium solute conc.(mg/L)
1	965	500	3.5
2	740	500	5.2
3	548	500	8.0
4	398	500	12.5
5	265	500	20.5
6	168	500	33.0
7	0	500	100

   b) Using data of Q.4(a) above, plot the data according to BET isotherm and determine the values of constants.

5. Describe in brief the following and mention its applications in water treatment using case examples:
   i) Reverse osmosis   ii) Ultrafiltration
   iii) Electrodialysis

6. a) Describe 'Henry's Law' equation of gas transfer which takes place at air-water interface.

   b) Classify types of aerators. Discuss the design criteria, working principle of any one in details.

7. Enlist the advance methods of water treatment. Describe the detail of any two methods including their respective limitations, merits and demerits compared to the conventional water treatment methods.

8. Write technical notes on (Any Four):
   a) Physical methods of disinfection
   b) Design criteria of mixed-bed adsorber
   c) Properties of cellulose acetate membrane
   d) Desalination
   e) Effect of temperature on reaction rate of chemical reactions
   f) Electrolytic defluoridation plant

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