

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014

Subject code: 731701**Date: 25-11-2014****Subject Name: Design of Water and Wastewater System****Time: 02:30 pm - 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)** Answer the Following : **07**
- (1) Justify the 1 PPM=1 mg/lit for Liquid.
 - (2) Differentiate among Total Solids , Total Volatile Solids and Total Fixed Solids
 - (3) Define Food to Microorganism Ratio
 - (4) What is Greywater? Enlist any two uses of Greywater.
 - (5) Why is the value of COD always higher than the value of BOD?
- (b)** Draw a neat sketch of Wastewater Treatment plant showing its various preliminary, primary, secondary units. Also mention the uses of each unit in brief. **07**
- Q.2 (a)** Describe the terms Neutralization and Equalization in wastewater treatment. **07**
- (b)** Determine the reaction order of reactant removal process for the data given below **07**
- | | | | | | | |
|---------------------------------------|-----|-----|-----|----|----|----|
| Concentration of Reactant in (mg/lit) | 230 | 150 | 100 | 50 | 30 | 20 |
| Time (min) | 0 | 7 | 15 | 25 | 35 | 40 |
- OR**
- (b)** State the Monod ϕ equation for the Microbial Growth with neat sketch **07**
- Q.3 (a)** Differentiate and describe Suspended Growth and Attached Growth Treatment with suitable examples **07**
- (b)** Describe the unit operation of Flootation and focus on Air flootation, Vacuum flootation. **07**
- OR**
- Q.3 (a)** Describe the process of designing Primary Settling Tank and its design criteria **07**
- (b)** Explain the process of Single stage and Two Stage Anaerobic digester with neat line sketches. **07**
- Q.4 (a)** Enlighten the use of Oxidation ditch with sketch. Enlist various design criteria for oxidation ditch. **07**
- (b)** Write short note on stream pollution and self purification **07**
- OR**
- Q.4 (a)** Enlist various aspects to be considered for the design of activated sludge processes along with various design criteria for the activated sludge process. **07**
- (b)** Describe the process description of Biological Nitrification and Biological Denitrification **07**
- Q.5 (a)** Classify various types of reactors with their suitabilities. **07**
- (b)** What does the performance evaluation of waste water treatment plant mean? How does it carry out? **07**
- OR**
- Q.5 (a)** Describe the DO and BOD testing using conventional laboratory methods **07**
- (b)** Write Short note on: (1) Step Aeration and Kraus Process **07**
 (2) NRC Equations to determine efficiency of filters
