

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## GUJARAT TECHNOLOGICAL UNIVERSITY

M.E. SEMESTER III-EXAMINATION – WINTER 2015

Subject code: 2731703

Date: 04/12/2015

Subject Name: Treatment Process Design And Drawing

Time: 2:30 PM to 5:00 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) Discuss the biological and physical factors affecting the process of waste water treatment units. **07**
- (b) Enlist the units used for combined primary and secondary treatments for waste water treatment plant and explain any two in detail. **07**
- Q.2** (a) Draw the schematic flow diagram of water treatment process and explain any two processes in detail. **07**
- (b) Write a short note: Flow measuring devices. **07**
- OR**
- (b) Describe the design criteria for collection and transportation of water supply system. **07**
- Q.3** (a) Explain the following terms with the special treatment of reverse osmosis. **07**  
1) Recovery Factor 2) Concentration Factor 3) Membrane fouling.
- (b) Enlist the different tertiary treatment for waste water and explain membrane process. **07**
- OR**
- Q.3** (a) Explain Electro dialysis process with neat sketch. **07**
- (b) Design the grit chamber for 10MLD average waste water flow on basis of following data. Assume other required data **07**  
1) Peaking Factor-2.5  
2) Detention time-5min  
3) width to depth Ratio-1.5:1  
4) Liquid Depth-2 m
- Q.4** (a) Describe the design consideration of pump house and draw the schematic diagram of pump house. **07**
- (b) Design the circular and rectangular equalization tank for a waste water flow 18MLD with tank capacity of 650m<sup>2</sup>. Length :width ration is 2:1. Assume suitable criteria. **07**
- OR**
- Q.4** (a) Enlist different biological treatments used for domestic waste water and explain any one in detail. **07**
- (b) Design the screen chamber to treat maximum flow 13 MLD with area 0.24m<sup>2</sup> and having width of 0.6 m. Calculate the following details for screen chamber. Assume suitable criteria. **07**  
1) Flow velocity  
2) Numbers of bars  
3) Quantity of screening.

- Q.5** (a) Explain rotating biological contractor with schematic diagram **07**  
(b) Differentiate slow sand filter and rapid sand filter. **07**
- OR**
- Q.5** (a) Specified design criteria with schematic flow diagram of UASBR. **07**  
(b) Draw the flow diagram of sludge treatment facility and discuss sludge digester. **07**