*Prof. Anirban Dutta*

Roll No. _____

# JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
## TEST -1 EXAMINATION- February 2018
### B.Tech 6<sup>th</sup> Semester

COURSE CODE: 10B11CE613                                    MAX. MARKS: 15

COURSE NAME: Sewage Treatment and Disposal

COURSE CREDITS: 4                                          MAX. TIME: 1Hr

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*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. **Assume all necessary data suitably.***

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1. The following tests results were obtained for a wastewater sample. All the tests were performed using a sample size of 50 ml. Determine the concentration of total solids, total volatile solids, suspended solids, volatile suspended solids, total dissolved solids and total volatile dissolved solids.
   Tare mass of evaporating dish = 53.5433 gm
   Mass of evaporating dish + residue after evaporation at 105° C = 53.5794 gm
   Mass of evaporating dish + residue after ignition at 550° C = 53.5625 gm
   Tare mass of Whatman GF filter after drying at 105° C = 1.5433 gm
   Mass of Whatman GF filter and residue after drying at 105° C = 1.55554 gm
   Mass of Whatman GF filter and residue after ignition at 550° C = 1.5476 gm     **(2)**

2. A 25 ml sample of wastewater requires 175 ml of distilled water to reduce the odour to a level that is just perceptible. Find the threshold odour number (TON).     **(1)**

3. In a BOD determination 6 ml of wastewater are mixed with 244 ml of distilled water. The dissolved oxygen (DO) of distilled water is 9.1 mg/l. After 5 days incubation at 20° C, the DO content of the mixture is 2.8 mg/l. Calculate the BOD of the wastewater. Assume that the initial DO of wastewater is zero.     **(2)**

4. Explain carbonaceous BOD and nitrogenous BOD using graphical sketch.     **(2)**

5. The 5 day 20° C BOD of a wastewater is 185 mg/l. What will be the ultimate BOD? If the bottle had been incubated at 33° C what would be the $BOD_5$ have been? Assume k = 0.23 day$^{-1}$.     **(2)**

6. Design a bar rack and screen chamber for a peak design flow of 100 MLD with the following data.
   Flow conditions in incoming trunk sewer:
   Diameter of incoming sewer = 1.50 m
   Depth of flow in sewer at peak flow = 1.1 m
   Velocity in sewer at peak design flow = 1.15 m/s
   Drop of screen chamber floor to invert = 0.2 m
   Assumed width of rectangular bars = 10 mm
   Clear spacing between bars = 25 mm
   Assume velocity of flow through rack Openings = 1.0 m/s
   Sketch a hydraulic profile through bar rack under clean conditions. *Assume any other necessary data suitably.*     **(5)**

7. Write short notes on: (a) Objective of wastewater treatment (b) Functions of approach channel.     **(1)**