Unit-V

5. a) Briefly define the term "Nitrification" and "De-nitrification".
   b) What do you understand by adsorption by Activated carbon?
   c) Briefly describe "ultrafiltration" with its salient points.
   d) Describe with the help of diagram, Ammonia Striping method.

OR

How Nitrogen and Phosphorous can be removed from sewage.

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Total No. of Questions : 5] *[Total No. of Printed Pages : 4*

Roll No.....

CE-703

B.E. VII Semester

Examination, December 2016

Environmental Engineering - II

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each question are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.
v) Assume any missing data if required.

Unit-I

1. a) What do you understand by "Ovoid Sewers"?
   b) Which type of force is predominant in case of design of Sewer pipes? Explain.
   c) What do you understand by the term "Self-Cleansing velocity" in sewers?
   d) A Rectangular Sewer with width 1.5 times it depth is hydraulically equivalent to a circular one. Find the relation between the width of rectangular sewer and the diameter of the circular sewer.

OR

A 50cm diameter sewer is required to flow at half depth on a grade ensuring a degree of self-cleansing equivalent to that obtained at full depth of a velocity of 0.9m/s. Find the required grade, associated velocities and discharges at full depth and half depth. Take a uniform value of N = 0.015

Unit-II

2. a) What do you understand by First stage and Second stage BOD?
   b) Explain "Nitrogen Cycle" with clarification of end products.
   c) What do you understand by the term "Population equivalent" and "Relative Density" Why and where these terms are used?
   d) A 2% solution of a sewage sample is incubated for 5 days at 20 degree Celsius. The depletion of oxygen was found to be 5 ppm. Determine the BOD of the sewage.

OR

The BOD_5 of a waste has been measured as 800 mg/l. If the rate constant K'=0.26/day (base e), what is the ultimate BOD of the waste? What proportion of BOD_u would be remaining unoxidised after 20 days?

Unit-III

3. a) What is the objective of Preliminary and Primary treatment of wastewater?
   b) Distinguish between fresh sewage, stale sewage and septic sewage.
   c) What do you understand by Zone of pollution in the streams? Explain each zone clearly with neat sketches?

   d) Design the parabolic section of a grit chamber for the following data :

Max. Flow : 50000 m^3/day

Min. Flow : 12000 m^3/day

Average Flow : 30000 m^3/day

Horizontal Velocity : 0.25 m/sec

OR

What do you understand by Type I, Type II, Type III and Type IV sedimentation? Explain clearly.

Unit-IV

4. a) What do you understand by Sludge thickening?
   b) What do you understand by Food to microorganism ratio?
   c) What do you understand by the term "Activated Sludge"? What are its properties?
   d) A Single stage filter is designed for an organic loading of 10000 kg of BOD in raw sewage per hectare meter per day with a recirculation ratio of 1.2. This filter treats a flow of 4 MLD of raw sewage with a BOD of 220 mg/l. Determine the strength of the effluent.

OR

The MLSS concentration in an aeration tank of activated sludge process in 2500 mg/l and the sludge volume after 30 minutes of settling in a 1000 ml graduated cylinder is 180 ml. Determine :

i) SVI

ii) Return sludge ratio required and

iii) SS concentration in the return sludge.