B. Tech Degree VII Semester Examination, November 2009

CE 701 A ENVIRONMENTAL ENGINEERING II
(2006 Scheme)

Time: 3 Hours   Maximum Marks: 100

PART A
(Answer All questions)

(8 x 5 =40)

I. a. Name various disinfecting agents and explain the action of any two of these in detail
    b. Explain the lime soda method of removing hardness of water. What are its advantages and disadvantages.
    c. What is skimming tank? How is it different from a detritus tank?
    d. Enumerate the different effluent standards for wastewater as per BIS.
    e. With a neat flow diagram explain activated sludge process.
    f. Explain about the construction and operation of an oxidation ditch.
    g. Write short notes on (i) Aerated lagoon (ii) Rotating biological contactors.
    h. State the objects of sludge digestion. What factors influence the stages of sludge digestion.

PART B

(4 x 15 =60)

II. a. What are the factors to be considered in the design of continuous type sedimentation tanks? (7)
     b. Find the dimensions of a rectangular sedimentation basin for the following data
        (i)   Volume of water to be treated   =   3 million litres/day
        (ii) Detention period   =   4 hrs.
        (iii) Velocity of flow   =   10cm/min.   (8)

OR

III. a. With a neat sketch describe the working of clariflocculator. (7)
     b. Compare slow sand and rapid sand filters with respect to any four points. The population of a city is 50,000 and the per capita consumption is 130 litres/day. Calculate the following in respect of the rapid sand filter for the above data;
        (i) Total area of filters (ii) Number and dimensions of each filter (8)

IV. a. Describe the grit chambers with special reference to their purpose, design aspects, location, nature of grit and number. (7)
     b. Describe the various types of screens. Assuming suitable design criteria, design a screen chamber to treat a maximum discharge of 0.20 m^3/sec. (8)

OR

V.   a. What are the different classification of sedimentation tanks? (8)
     b. Design a primary clarifier for a town having a population of 34000. The formation of sewage may be assumed at 150 litres per capita per day. (7)

VI. a. Explain with a neat sketch the working of a trickling filter. What is the principle on which it works? (8)
     b. Design a standard rate trickling filter to treat 10 million litres per day of settled sewage having a B.O.D of 180 mg/l, it is desired to produce a filter effluent having a B.O.D of 20 mg/l. Check also for hydraulic loading. (7)

OR

VII. a. Sketch and explain the types of aeration systems in an activated sludge process. (8)
     b. Design an oxidation pond for treating sewage from a hot climatic residential colony having population of about 5000 persons. The contribution of sewage is the rate of 120 litres per capita per day and the 5-day B.O.D. of sewage is 300 mg/l. (7)

VIII. a. Why is it necessary to treat the sewage sludge? Explain the sludge treatment processes. (8)
      b. Enumerate the various methods of sludge disposal. (7)

OR

IX. a. What are the essential features of high rate anaerobic systems? Briefly discuss about UASB, Fluidized and Expanded Bed reactors. (8)
     b. Design a septic tank of 200 population colony and illustrate your design with a neat sketch. The rate of water supply may be assumed to be 140 litres per head per day. (7)

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