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B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Fifth Semester

Civil Engineering

CE 1304 — ENVIRONMENTAL ENGINEERING

(Common to B.E. (Part-Time) Fourth Semester R–2005)

(Regulation 2004)

Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

What are the objectives of a water supply system?

What is the significance of "Hardness" and "pH of water"?

Distinguish between Coagulation and Flocculation.

What is the principle of water softening by ion exchange method?

What is indicated by BOD and COD of sewage?

List four important factors in the selection of sewer pumps.

What are the functions of screen chamber and grit chamber?

What are the essential components of an Activated sludge process?

What is Oxygen Sag Curve?

Explain any two critical impacts of land disposal of sewage.

PART B — (5 × 16 = 80 marks)

(a) (i) Explain the factors affecting per capita demand for water in cities.
(9)

   (ii) Discuss the effects of variations in demand on the design capacities of different components of water supply scheme? (7)

Or

(b) (i) The population of a township for the past five decades as per the census records is given below :

Year :	1961	1971	1981	1991	2001
Population :	25,000	28,000	34,000	42,000	47,000

Determine the daily water demand of the city in 2031, if the per capita water demand will be 135 Lpcd. Assume arithmetic increase in population. (9)

   (ii) With the help of neat sketch, explain the "Socket and Spigot" and "Flanged" methods of jointing water supply pipes. (7)

12. (a) (i) What are the requirements of a good water distribution system? (6)

(ii) Explain the theory of hardy cross method of analysis of water distribution system. (10)

Or

(b) (i) With the help of a neat sketch, explain the function and operation of a rapid gravity sand filter including its cleanup? (12)

(ii) What are the functions of a service reservoir? (4)

13. (a) (i) Assume that the surface on which the rain falls in a city is classified as follows :

Nature of surface :	Roof	Pavements	Pave Yards	Maccadam Roads	Lawns and Gardens	Thick Vegetation
Areal distribution (% of total)	20	20	5	15	35	5
Coefficient of runoff	0.90	0.85	0.80	0.40	0.1	0.05

If the total area of the city is 36 hectares and the maximum rain fall intensity is 5 cm/h, estimate the runoff from the city? (12)

(ii) Explain the standards for sewage disposal. (4)

Or

(b) (i) A 2% solution of a sewage sample is incubated for 5 days at 20°C. Determine the BOD of the sample if the depletion in oxygen was found to be 4 ppm. (6)

(ii) Explain the steps involved in laying, jointing and testing of sewer lines. (10)

14. (a) (i) Explain the operational principles of Stabilization Ponds and Oxidation ditch. (10)

(ii) How to treat and dispose sludge from sewage treatment. (6)

Or

(b) (i) With the help of a neat sketch, explain the function and operation of Trickling filter. (10)

(ii) Is it possible to recover biogas from sewage? How? (6)

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(i)   Explain the Streeter Phelp's model and its applications.   (8)

(ii)   Discuss the different techniques for wastewater reclamation?   (8)

<div align="center">Or</div>

b)   (i)   Explain the factors controlling self purification of rivers.   (8)

(ii)   The sewage from a town at the rate of 8 million liters per day with a BOD of 250 mg/L is to be discharged into a river having a flow of 200 L/s and BOD 6 mg/L. Determine the BOD of the diluted mixture on disposal.   (8)

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