## **FACULTY OF ENGINEERING**

## B.E. 3/4 (Civil) II – Semester (New) (Main) Examination, May 2013

**Subject: Water and Wastewater Engineering** 

Time: 3 hours Max. Marks: 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

## PART – A (25 Marks)

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1.	What are the various sources of water?	3	
2.	Discuss briefly the importance of treating water for public supply.	2	
3.	Write about breakpoint chlorination.	3	
4.	Explain the importance of chemical and bacteriological analysis of water used for domestic purpose.	2	
5.	Explain the terms a) BOD b) COD c) TOC	3	
6.	What are the factors effecting storm sewage?	2	
7.	What do you understand by preliminary treatment of sewage? Enumerate the various unit operations involved in preliminary treatment of sewage.	3	
8.	Describe the various methods used for aeration in the activate sludge process.	2	
9.	Describe the components of a septic tank with the aid of sketch.	2	
10	.What are the methods of collection of solid waste?	3	
	<b>PART – B</b> (50 Marks)		
	.a) The population of a locality as obtained from census report is as follows:		
	Census year 1881 1891 1901 1911 1921 1931 1941 1951 1961		
	Population 8000 12000 17000 22500 29000 37500 47000 57000 66500		
	Estimate the population of the locality in the years 2001, 2021 and 2041 by incremental increase method.	6	
	b) Explain the water distribution systems and solution of a simple network using Hardy cross method.	4	
12	.a) Design the sedimentation tank of a water works to treat the water per day.  Assume the velocity of flow in the sedimentation tank as 20 cm/minute and the detention period is 11 hours.	6	
	b) What are the merits and demerits of the rapid sand filters as compared with the slow sand filters?	4	

13.a) A sewer, having diameter 1.20m, is laid at a gradient of 1 in 400, calculate the velocity of flow and discharge through this sewer when running one-half full. Assume N = 0.012 in Manning's formula.	4
b) Determine the velocity of flow by Emperical formulae. What points should be kept in mind while designing sewers? Explain in detail various steps involved in the design.	6
14.a) Design a secondary settling tank for an activated sludge process with the following design data.	7
Average sewage flow = 9 Mld  MLSS concentration = 300 mg / lt.  Peak flow factor = 2.25  Recycle rate = 30%	
b) Describe briefly about the preliminary treatment using screens.	3
15.a) Write short note on collection and recovery of refuse. What are the different methods of disposal of solid refuse?	5
<ul> <li>b) Design a septic tank for 50 users, assuming the rate of water supply as 60 litres / head / day.</li> </ul>	5
16.a) Take 5 day BOD at 20°C is equal to 250 mg / lt. for three different samples, but the 20°C, K values are equal to 0.12 / day, 0.16 / day and 0.20 / day. Determine the ultimate BOD of each sample.	5
<ul> <li>b) Discuss in detail about the low cost waste treatment comprising of oxidation ponds and RBC.</li> </ul>	5
17. Discuss the following in detail.	10
<ul><li>i) Disinfection – necessity and methods</li><li>ii) Sewer types and appurtenances</li><li>iii) Sludge digestion and disposal methods</li></ul>	

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