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V SEMESTER B.TECH (CIVIL ENGINEERING) END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ENVIRONMENTAL ENGINEERING-1 [CIE 307]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

✤ Answer ANY FIVE FULL the questions.

✤ Missing data may be suitable assumed.

- **1A.** What are the objectives of a water supply scheme?
- **1B.** What is design period? Mention the factors kept in view while fixing the design period.
- 1C. Estimate the population of the year 2040 and 2046 for a city whose population in the year 1970 was 25,000 and in the year 2010 was 47,000. Use geometric increase method. Also calculate fire demand of the city for the year 2046 using Kuichling's formula.

2A.	List out any eight factors effecting per capita demand.	
2B.	Explain in brief about springs and Infiltration wells.	
2C.	Water is to be raised from a tube well to an overhead storage tank. Work out the	4
	B.H.P. of the electro-motor pumping set from the following data:	

Discharge of tube well	- 30 liters per second
Length of raising main	- 200 m
Coefficient of friction	- 0.018
R.L. of ground level	- 200.00 m
R.L. of water level in the well	- 192.00 m
Depression head	- 5 m
R.L. of water level in overhead tank	- 215.00 m
Combined efficiency of pump	- 75%
Velocity in rising main	- 180 cm per second





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3A.	An engineer suggests the following design parameters for a city's proposed rapid sand filter: Flow rate = $0.6 \text{ m}^3/\text{s}$, and loading rate to filter = $125.0 \text{ m}^3/\text{dav/m}^2$. How	4
	much surface area is required for the filter? Select the number of equally sized filters, and size these filters assuming a length to width ratio of 2.5 with a maximum surface	
	area of each filter being 75 m^2 .	
3B.	Discuss the sources and impacts of colour and odour in water quality. How they are measured?	3
3C.	Explain different factors which effect the process of sedimentation.	3
4A.	Write a short notes on the following:	6
	 (i) Specification and functions of gravel layer in a rapid sand filter (ii) How the flocs are formed when chemicals like alum is used as coagulant? (iii) Factors on choosing the type of feeding device 	
4R	With the neat sketch explain cyclone separator and electrostatic precipitators.	4
40.		
5A. 5B.	List four different layouts of water distribution system and explain any three of them. List any 4 methods of defluoridation. Briefly explain Nalgonda Technique of fluoride removal	3
5C.	Explain the principle and working of electro dialysis process and reverse osmosis process of desalination.	3
6A.	List out the various methods of removing permanent hardness and explain demineralization process in detail including regeneration of exhausted resin.	5
6B.	Chlorine usage in the treatment of 20000 cubic meter per day is 8 kg/day. The residual after 10 min contact is 0.2 mg/l. Calculate the dosage in mg/l of chlorine	2
	demand of the water.	
6C.	Explain briefly the following processes:	3
	i. Plain chlorination	
	ii. Pre chlorination	

iii. Super chlorination