

5E5062	Roll No. _____	Total No of Pages: 3
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	B. Tech. V Sem. (Main/Back) Exam., Nov.-Dec.-2016	
	Civil Engineering 5CE2A Environmental Engineering - I	

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks Main: 26
Min. Passing Marks Back: 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1. NIL _____

2. NIL _____

UNIT - I

- Q.1 (a) State and briefly discuss the factors affecting population growth. [8]
(b) Write a detailed note on 'Variations in rate of demand of water.' [8]

OR

- Q.1 (a) The population of a city as per the census records available is as follows - [12]

Census year	1951	1961	1971	1981	1991	2001	2011
Population	237980	401000	515000	617000	725000	838000	959000

Estimate the population of the city after four decades by arithmetical increase, geometrical increase and incremental increase method.

- (b) Elaborate the term 'Environment' and discuss the necessity of clean environment. [4]

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UNIT – II

- Q.2 (a) Discuss the common impurities found in water along with their adverse effects. [8]
- (b) Explain the hydrological cycle and the ill effects of environmental pollution on the hydrological cycle. [8]

OR

- Q.2 (a) What are the Indian standards for the permissible limits of the TDS, fluoride, hardness and nitrate in the drinking water? What do you understand by indicator organisms? Explain the MPN technique for determining bacterial quality of water. [8]
- (b) Explain the procedure to determine hardness and chloride in water. [8]

UNIT – III

- Q.3 (a) Design a rectangular sedimentation tank to treat 2 million liters of raw water per day. The detention period may be assumed as 2.5 hrs, depth of tank as 2.7 m and L/B ratio as 2.8. Draw a neat sketch of the same. [8]
- (b) With the help of a flow diagram, describe the unit processes in a municipal water treatment system. Also describe what kind of impurities will be removed after the end of each process. [8]

OR

- Q.3 (a) It is desired to increase, in a section of an existing pipe effectively, head by 15 m at the end and discharge by 70%. The diameter of the pipe is 500 mm and length is 800 m. The present discharge is 6000 lit/min. Design a suitable pump if the efficiency of pump is 90% and $f = 0.03$. [8]
- (b) What are the qualities of a good coagulant? Describe the basic principles of coagulation and flocculation. [8]

UNIT – IV

- Q.4 (a) Design all principle components of a rapid sand filter of a city having a population of 85000 with an average water supply of 175 liters /capita/day. Draw a neat sketch of the same. [8]

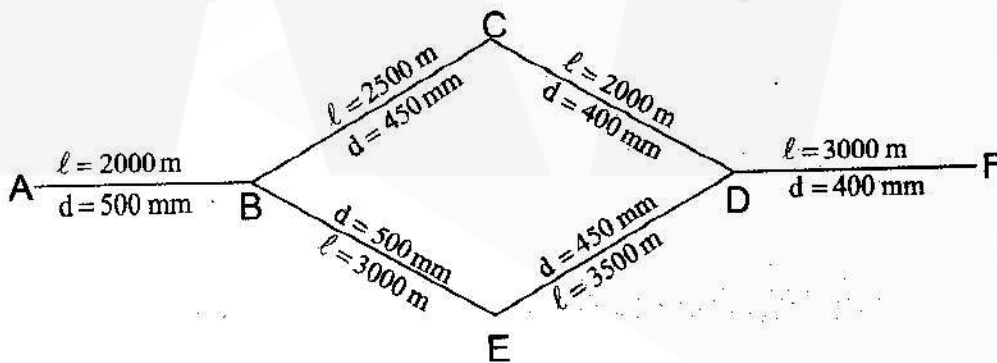
- (b) Differentiate between disinfection and sterilization. Explain the terms chlorine demand, combine chlorine, residual chlorine and free chlorine. Further, explain the importance of pH in efficiency of disinfection. [8]

OR

- Q.4 (a) Find the quantity of bleaching powder required per day to treat 6 million liters of water per day. The chlorine demand for disinfection is 2.8 mg/lit and amount of residual chlorine is 0.3 mg/lit. Assume that available chlorine of bleaching powder is 30%. [8]
- (b) Explain the working of a slow sand filter with neat sketch. What are the desirable qualities of filter media? [8]

UNIT - V

- Q.5 (a) Describe Hardy-Cross method to analyze water distribution network by balancing flows by correcting heads method. [8]
- (b) Find the equivalent pipe of 400 mm diameter for the loop given below: [8]



OR

- Q.5 (a) How will you determine the capacity of a service reservoir by mass curve method? [8]
- (b) Illustrate with sketches the different types of layouts of pipe systems in distributing water and compare their merits and demerits. [8]