B.E.Seventh Semester (Third Year) (Civil Engg.) (Part Time) (Annual Pattern)

Environmental Engineering - I : 3 PT C04 - 5 SC 3 / 7 CE 04

P. Pages : 3 | AU - 3531Add

Time : Three Hours | Max. Marks : 80

* 1050 *

Notes : 1. All question carry equal marks.
2. Answer **three** question from Section A and **three** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) A city has following census data. **6**

1951	73245
1971	126447
1991	198205

Calculate the saturation population and expected population in 2011.

b) Discuss the location of intake. **6**

c) State in brief the criteria for selection of source of water. **2**

OR

2. a) Forecast the population in the year 1980, 1990 and 2000 by means of geometrical increase method. **6**

Year	Population
1940	1,17,452
1950	1,89,685
1960	2,01,999
1970	3,02,425

b) State the design period in years of the following. **2**

i) Distribution System ii) Pump Set

iii) Storage dams iv) Water treatment unit.

c) State the factors affecting water demand. **6**

3. a) What points you will take into account while collecting representative sample. **5**

b) State and explain various methods of determining turbidity. **2+4**

c) Define : **2**

i) One degree hardness.

ii) Permanent hardness.

OR

4.	a)	Draw a neat sketch of pH scale.	**2**
	b)	What are the common impurities mostly found in natural water? Explain their effect on the quality of water.	**7**
	c)	What is mean by water quality standards. Give I.S. requirements of water (any four).	**4**
5.	a)	Find the terminal velocity of a spherical particle with dia 0.5 mm and sp. gravity of 2.65, settling through water at viscosity 1.002×10^{-3} N.S / m^2.	**2**
	b)	State the advantages and disadvantages of aeration.	**2+3**
	c)	Explain different feeding devices of Coagulants. Draw neat sketches.	**5**
6.	a)	Determine the settling velocity of a spherical particle 5×10^{-3} cm. The specific gravity is 2.65 and kinematic viscosity at 20°C is 1.01×10^{-2} cm^2 / sec. If the sp. gravity of another particle is 0.9, check at what rate the particle will rise or settle.	**7**
	b)	Why alum is commonly used coagulant? Write down the reaction.	**6**

SECTION - B

7.	a)	Compare points by points a slow sand filter and rapid sand filter.	**5**
	b)	Design a set of three rapid gravity filters for treating the water at a treatment plant which has to supply the water to a town of population 1,65,000. per capita demand of the town is 165 L/d. The rate of filtration of the filter is 4500 L/hr/sqm.	**5**
	c)	State the properties of sand used in the filters.	**2**

OR

8.	a)	State the drawbacks of rapid sand filters.	**2**
	b)	Write a note on :	**4**
		i) Diatomite filter.	
		ii) Dual media filters.	
	c)	For a mixed media filter, calculate the particle sizes of anthracite and ilmenite which have settling velocities equal to that of silica sand of 0.4 mm in dia. Take sp. gravity of sand, anthracite and ilmenite as 2.65, 1.45, 4.2 respectively.	**3**
	d)	State advantages of pressure filters.	**3**
9.	a)	State the advantages and disadvantages of boiling as a method of disinfection.	**4**
	b)	State the Nalgonda technique developed by NEERI regarding defluoridation.	**4**

c) State the advantages of double chlorination. 3

d) State any three properties of disinfectants. 3

OR

10. a) Name only for the application of chlorine used in the following. 3
    i) application of chlorine after its treatment.
    ii) application of chlorine to raw water.
    iii) application of chlorine at two or more points.

b) The population of a town is 75,500 and rate of demand of water is 150 L/c/d. Calculate the amount of bleaching powder required per year. If the disinfection is to be done by the bleaching powder having 45% available chlorine. The required dose of chlorine at the water works is 0.3 ppm for disinfection. 5

c) Explain : 6

i) Ion exchange.

ii) Desalination

11. a) State the ideal requirements of distribution system. 5

b) State the name of joint used in case of following types of pipes. 3
    i) C. I. Pipe
    ii) G. I. Pipe
    iii) Steel pipe

c) What are the advantages of dual system of distribution system. 5

OR

12. a) Discuss with the help of diagrams, various methods of laying out the distribution system. 6

b) State the disadvantages of intermittent water supply. 3

c) How is the routine maintenance of distribution system carried out. 4

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