Printed Pages : 3

NEN401

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 197404

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15

WATER SUPPLY AND TREATMENT ENGINEERING

Time : **3** Hours] [Total Marks : **100**

NOTE : Attempt all questions, suitably assume the missing data.

1 Attempt any four parts of the following: 5×4=20

(a) Discuss the sources and impacts of turbidity.

(b) A sample of water from a surface steam is analyzed for the common ions with the following results:

Ca^{++} = 90 mg/L Cl^{-} = 80 mg/L

Mg^{++} = 20 mg/L HCO_3^{-} = 320 mg/L

Na^{+} = 70 mg/L SO_4^{--} = 120 mg/L

(i) What is % age error in the cations balance?

(ii) Draw a bar diagram for the water.

(c) The 5-d 20 °C BOD of a wastewater is 212 mg/L. What will be the ultimate BOD? What will be the 10 days BOD? If the sample had been incubated at 30 °C what would the 5 day BOD have been? Use K_{20} = 0.23 d^{-1}.

(d) A city must treat about 12000 m^3/d of water flocculating particles are produced by coagulation and a column analysis indicates that an overflow rate of 20 m/d will produce satisfactory removal at a depth of 3.20 m. Determine the size of the required settling tank with neat sketch.

(e) Explain Break point chlorination and Super chlorination.

(f) How are suspended solids measured? Also define Threshold Number (TON).

2 Attempt any four parts of the following: 5×4=20

(a) Discuss the construction and working of a rapid sand filter.

(b) Design the approximate dimensions of a set of rapid gravity filters for treating water required for a population of 40,000, the rate of supply being 135 ltr/capita per day. The filters are rated to work 4500 ltrs per hour per sq.m. Assume data not given.

(c) Write advantages and disadvantages of multi media filters.

(d) Chlorine usage in the treatment of 18,000 cubic meter per day is 9 kg per day. The residual after 10 min. contract is 0.20 mg/l. Calculate dosages in milligrams per litre and chlorine demand of water.

(e) Differentiate between carbonaceous and non carbonaceous hardness of water.

(f) Explain Aeration mechanism.

3 Attempt any two parts of the following: 10×2=20

(a) With a neat sketch explain ion exchange process of water softening.

(b) Explain Reverse Osmosis process for desalination.

(c) Explain physical adsorption with respect to Freundlich isotherm.

4 Attempt any two parts of the following: 10×2=20

(a) Using Geometrical increase method predict the population of a town for 2031 and 2041 with the following census records :

Year	1991	2001	2011
Population	2,50,000	4,90,000	7,40,000

(b) Explain simons non recording raingauge with neat sketch.

(c) Discuss the "Logistic Curve Method" for determining the future population of a locality.

5 Attempt any two parts of the following: 10×2=20

(a) Compare the merits and demerits of the continuous and intermittent system of water supply.

(b) Design the diameter of cast iron pipe required for the distribution system of a part of a small city of population 10,000. Assume rate of supply and terminal pressure etc.

(c) Write short notes on :

(i) Water meter (ii) Drain valve

(iii) Air valve (iv) Manhole.