

Tests

Environmental Engineering-I

Duration: 30 minutes

Instructions:

- 1) Late entry is permitted only up to 5 minutes of start of the test.
- 2) Students are forbidden to borrow anything (including paper, pen and calculator).
- 3) Only scientific calculators are allowed.
- 4) Use of cellphones for any purpose is banned.
- 5) Cheating, talking, cellphone use, arguing with invigilator or any other form of test disruption is to be awarded 0 marks.

Test#1

1. What are Indian drinking water quality standards for pH, turbidity, TDS, hardness and chlorides?

[4]

2. Given the following population data, determine the population of year 2030 and 2050 using geometric increase and incremental increase methods:

[6]

Year	Population
1970	50,000
1980	58,000
1990	62,000
2000	67,000
2010	70,000

Test#2

Determine the daily quantity of sodium hypochlorite required for chlorination of a 5 MLD capacity WTP facility. Assume that the chlorine demand of the raw water is 1.8 ppm.

Test#3

How many pipes of the following materials can be carried by a truck (each of 5 tonne capacity): RCC (M20 mix), Steel and PCC.

Assume that the external diameter of the pipe is 3 m, length is 8 m and thickness is 15 cm.

Test#4

Estimate the hydraulic gradient in a 2.5 m diameter smooth concrete pipe carrying a discharge of $5 \text{ m}^3/\text{sec}$ by

Darcy-Weisbach ($f' = 0.011$)

Manning's ($n = 0.013$)

Hazen-William ($CH = 130$)

Modified Hazen-William ($CR = 1$)

Test#5

1. Design a sedimentation tank for a city of 1,00,000 residents.
2. Design rapid sand and slow sand gravity filters for a city of 1,00,000 residents.
3. Using Decreasing rate method calculate the population of years 2030 and 2050, given the following data

Year	Population
1970	50,000

1980	58,000
1990	64,000
2000	67,000
2010	72,000

4. Using the population data in question 3 for years 1970-2000, calculate the saturation population and time to reach saturation population.

Test# 6

Environmental Engineering-I

1. Write a short note on Rainwater Harvesting and how it works? [5]
2. Name and describe some treatment option for small communities. [5]