



RM-7047

B. E. - III (Sem. VI) (Civil) Examination

May / June - 2010

Environmental Engg. - I

Time : 3 Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दशांशवैध निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 3 (Sem. 6) (Civil)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Environmental Engg. - I"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="7"/>	<input type="text"/>
Section No. (1, 2,.....): <input type="text" value="1&2"/>	<input type="text"/>
	Student's Signature

- (2) Assume suitable data where necessary.
- (3) Figures on the right indicate full marks.
- (4) Use separate answer book for each section.
- (5) Draw neat sketch wherever necessary.

SECTION - I

- 1 (a) Explain the different types of chlorination. 6
- (b) Draw a neat layout of water treatment unit and explain flocculation tank. 6
- (c) The size of sedimentation tank is 8m x 16 m and 5
water depth of 4m. Find the detention time for the tank and average flow velocity through the tank. If 60 ppm is the concentration of suspended solids present in turbid raw water, how much dry solids will be deposited per day in the tank 80% removal in the base. Assume average specific gravity of the deposited material as 2 (two). Discharge passing through tank is 3 million litres per day.
- 2 Attempt any two : 9×2=18
 - (i) Differentiate slow sand and rapid sand filters.
 - (ii) What are the methods of removing permanent hardness. Explain any one in detailed.

- (iii) Design a coagulation-cum-sedimentation tank with continuous flow for a population of 70,000 persons with a daily per capacity water allowance of 130 litres. Detention period = 4 hours. Assume data where necessary. (maximum daily demand = 1.8 average daily demand period of flocculation = 20 minutes.

3 Write short notes on (any **three**) **5×3=15**

- (i) Filtration process
- (ii) Wet feeding devices
- (iii) Disposal of sludge from water treatment plant
- (iv) Back washing
- (v) Remedial measures against formation of mud balls.

SECTION - II

4 (a) Answer in one sentence or so : **5**

- (i) What is palatable water?
- (ii) Give standard limits for phenolic compounds in drinking water.
- (iii) Enlist the formula used for computing the quantity of water for Fire Demand.
- (iv) What is priming of pump?
- (v) State any 2 advantages of pipe line over open channel as conduit in water supply.

(b) State true or false: **5**

- (i) The arithmetic increase method of forecasting population gives higher value as compared to geometric increase method.
- (ii) River water is generally free from suspended impurities.
- (iii) In any ecosystem, the flow of nutrients is cyclic.
- (iv) Spigot and screw joints are preferred in cement concrete pipes.
- (v) Circular system is a most suitable layout of a distribution system for well planned cities.

- (c) Enlist various population forecasting methods. In which circumstances the logistic curve method is used? 8

Following is the population of a city as noted from the census department. Determine (a) the saturation population (b) the expected population in 1980.

Year	Population
1950	35,000
1960	78,000
1970	1,15,000

- 5 (a) Give the profile of the pipeline showing the position of various valves on it. Discuss various valves used in water supply pipe network. 7

OR

- (a) What are the requirements of good quality drinking water? Discuss the significance of Hardness and Turbidity. 7

- (b) Attend any two : 10

(i) Water is pumped from a clear water reservoir 3.0 m deep and maximum water level at 25.00 m, to an elevated reservoir at 78 m at the constant rate of 8,00,000 liters/hour. The distance between two reservoirs is 2000 m. Find the economical diameter of the rising main and water horse power of the pump. Neglect minor losses and take $f = 0.01$.

(ii) An overload tank is to be provided for a city water supply. Given the following data, calculate the minimum capacity of the tank without any five demand storage. Assume the tank to be empty between 12 and 15 hours. The draw off factors, water pumped, and water consumed etc. are given in table below.

No.	Time (hr)	Hours	Draw-off factor	Water pumped	Water consumed	Accumulation(t) Draw-off(-)	Water in service reservoir (S.R.)
	1	2	3	4	5	6	7
A	0-4	4	0.2	0	13,333		
B	4-6	2	1.2	50,000	40,000		
C	6-10	4	1.8	1,00,000	1,20,000		
D	10-12	2	1.0	50,000	33,333		
E	12-15	3	0.5	0	25,000		
F	15-16	1	0.5	25,000	8,333		
G	16-20	4	1.6	1,00,000	1,06,666		
H	20-23	3	1.0	75,000	50,000		
I	23-24	1	0.2	0	3,333		

Compute columns 6 and 7 of the table to calculate the storage capacity of tank.

Use following data :

- (a) Average water supply = 16,666 liters/hr.
- (b) Rate of pumping = 25,000 liters/hr.
- (c) Hours of pumping = 4.12 and 15-23.

Note : Only columns 6 and 7 may be reproduced in answer book to save time.

- (iii) Discuss with the help of diagrams various methods of laying out the distribution system.

6 Write short notes : (any **three**)

15

- (i) MPN test
- (ii) Infiltration wells
- (iii) Components of ecosystem
- (iv) Centrifugal pump
- (v) Rural water supply project.