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Question Paper Code : 41005

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Fifth Semester

Civil Engineering

080100027 – WATER SUPPLY ENGINEERING

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   What are the demerits of intermittent water supply?

2.   What is meant by per capita rate at water demand?

3.   What is the significance of rainfall index?

4.   Distinguish between confined and unconfined aquifer.

5.   State any two water quality parameters that can be analyzed by titrimetric method.

6.   Name any two water borne diseases.

7.   Enumerate the mechanisms of filtration.

8.   Distinguish between free chlorine and residual chlorine.

9.   Why are distribution storage tanks often elevated above the ground level by a tower?

10. What is the purpose of intake?

PART B — $(5 \times 16 = 80 \text{ marks})$

11. (a) Explain in brief different methods used for prediction of future population of a city, with reference to the design of a water supply scheme.

Or

(b) (i) Discuss the factors to be considered in fixing the design periods for water supply components. (8)

(ii) Discuss the various factors influencing fluctuation in rate of demand. (8)

12. (a) (i) Enumerate and explain the types of precipitation. Briefly outline the procedure to measure rainfall in a particular place. (12)

(ii) Estimate the peak rate of runoff from a 3.9 km² drainage basin that has a composite runoff coefficient of 0.34, if the critical rainfall intensity is 26 mm/h. (4)

Or

(b) (i) Draw a neat sketch of an infiltration gallery and explain the salient features. (10)

(ii) Briefly discuss the classification of wells. (6)

13. (a) (i) Explain the various physico-chemical characteristics of water and briefly state the environmental significance. (10)

(ii) What are the factors to be considered in the selection of pipe material for water transmission? (6)

Or

(b) A centrifugal pump with the following characteristics is installed in a system to raise water from one reservoir to another. The water surface elevation in the first reservoir is 100 m and that in the second reservoir is 150 m. The pipeline connecting the reservoir is 3 km of 350 mm diameter. Determine the operating point in the system. Take $C_H = 110$. Also, compute WHP and BHP of the pump assuming pump efficiency of 70%.

Pump discharge, Lpm	0	660	1400	2150	3000	3650
Total dynamic head, m	66.0	61.5	57.0	50.5	37.5	22.0

14. (a) Draw a flow diagram of a conventional surface water treatment plant and explain the various unit operations and processes involved in it.

Or

(b) (i) Calculate average chlorine required per day to treat 80 ML/d of water. Also calculate the storage required for 60 days. Assume an average chlorine demand of 3.5 mg/L. Assume suitable data as applicable. (4)

(ii) Describe with sketches different methods of iron and manganese removal from ground water. (12)

15. (a) Describe the various layouts of distribution network in a water supply system with the help of relevant diagrams and state their advantages and disadvantages.

Or

(b) A town having a population of 6,78,000 and 100 Lpcd water supply follows the following demand pattern:

Duration	Supply (%)
6 am - 9 am	34
9 am - 12 Noon	16
12 Noon -3 pm	4
3 pm - 6 am	8
6 pm – 9 pm	21
9 pm -12 Mid night	6
12 Midnight -3 am	2
3 am - 6 am	9
Total	100

Determine the storage capacity requirement of the distribution reservoir to be provided for balancing the variable demand against a constant rate of pumping. (i) if the pumping is done for all the 24 hours (ii) if the pumping is to be done only from 5 am to 11 am and 2 pm to 8 pm.

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