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(2066)

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B. Tech 6th Semester Examination

Water Supply and System Engineering (NS) June-16

CE-350

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (i) Draw the flow diagram of a typical water supply scheme using an impounded reservoir as the source of supply and explain therein the different works involved. (10)

   (ii) The population of 5 decades from 1930 to 1970 are given in table. Find out the population after one decade beyond the last known decade, using arithmetic and geometric increase methods.

Year	1930	1940	1950	1960	1970
Population	25,000	28,000	34,000	42,000	47,000

(10)

2. (i) What are the common impurities found in natural sources of water, and explain their effects upon its quality. (8)

   (ii) Explain any three:

   (a) Pathogenic and non-pathogenic bacteria.

   (b) Biochemical oxygen demand.

   (c) MPN index.

   (d) Water-borne diseases. (3×4=12)

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SECTION - B

3. (i) Enumerate and discuss briefly, various methods which are adopted collectively for treating water supplies drawn from a perennial river. (10)

   (ii) Write short notes on any four:

   (a) Chemical coagulation.

   (b) Carbonate and non-carbonate hardness.

   (c) Super chlorination and break point chlorination.

   (d) Plain settling.

   (e) Water softening. (10)

4. (i) Distinguish between slow sand and rapid sand filters with reference to:

   (a) Rate of filtration. (b) Filter media of sand.

   (c) Method of cleaning. (d) Loss of head.

   (e) Depth of bed for gravel and sand. (10)

   (ii) Design the approximate dimensions of a set of rapid sand filters for treating water required for a population of 50,000; the rate of supply being 180 litres per day per person. The filters are rated to work 5000 litres per hour per sq. m. Assume length of filter (L) equal to 1.5 times the width of filter (B). (10)

SECTION - C

5. (i) Write short notes on the following:

   (a) Causes of water wastage, its detection and prevention.

   (b) Predicting storage capacity of distribution reservoirs with mass curve method. (10)

   (ii) Explain the gravitational, pumping and combined systems of water distribution with neat diagrams. (10)

6. (i) Explain in detail the layout of a distribution network. (10)

   (ii) Describe:

   (a) Requirements of a good distribution network.

   (b) Requirement of a good hydrant. (10)

SECTION - D

7. (i) Explain any three of these house water connections:

(a) Ferrule. (b) Goose neck,

(c) Service pipe. (d) Stop cock.

(e) Water meter. (3×3=9)

(ii) How would you assess the water demand of the buildings to be used for different purposes? (6)

(iii) What do you understand by

a) Pressure release valve; and b) Check valve. (5)

8. (i) What is rain water harvesting? Explain with a neat sketch. (8)

(ii) Write a note on the rural and semi-urban sanitation systems. (6)

(iii) What do you mean by

(a) Low cost sanitation

(b) Night soil disposal.

(c) Chemicals toilets. (3×2=6)

SECTION - E

9. (i) Coincident draft in relation to water demand, is based on:

(a) Peak hourly demand.

(b) Maximum daily demand.

(c) Maximum daily + Fire demand.

(d) Greater of (a) and (c).

(ii) As compared to the geometrical increase method of forecasting population, the arithmetical increase method gives:

(a) Lesser value. (b) Higher value,

(c) Equal value. (d) May vary.

(iii) Most of the weather phenomena take place in the:

(a) Mesosphere. (b) Stratosphere,

(c) Ionosphere. (d) Troposphere.

(iv) The maximum quantity of water that can be supplied from a reservoir with full guarantee during critical periods, is called:

(a) Reservoir yield. (b) Design yield,

(c) Secondary yield. (d) Firm yield.

(v) The devices, which are installed for drawing water from different water sources are called:

(a) Filters. (b) Intakes,

(c) Outlets. (d) Inlets.

(vi) In design of water supply conduits, the larger value of the design velocity, if adopted, will:

(a) Reduce the cost of pipe. (b) Increase the cost of pumping,

(c) Both (a) and (b). (d) None of the above.

(vii) The suitable layout for a water supply distribution system, for an irregularly grown town, is:

(a) Dead end system. (b) Grid iron system,

(c) Ring system. (d) Radial system.

(viii) Water hammer pressure can be reduced by using:

(a) Fast closing valves. (b) Slow closing valves,

(c) Critically closing time valves. (d) None of these.

(ix) Temporary hardness of water is caused by:

(a) Carbonates and bicarbonates of Ca and Mg.

(b) Bicarbonates of Na and K.

(c) Carbonates of Ca and Mg.

(d) Dissolved CO_2.

(x) The most widely used coagulant for water-treatment, is:

(a) Lime and soda. (b) Ferrous sulphate,

(c) Chlorinated copper. (d) Alum.