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Subject Code: NCE 503

Paper Id:

100503

Roll No:

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B TECH
(SEM - V) THEORY EXAMINATION 2018-19
ENVIRONMENTAL ENGINEERING -I

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**
- a. What is a design period?
 - b. Write the name of common impurities found in water.
 - c. Name the different pipe appurtenances.
 - d. What are different methods for the detection of leakage of water?
 - e. Differentiate between the continuous and intermittent system of water.
 - f. State the principles of designing the pipe lines.
 - g. What is an object of drop manhole?
 - h. State the principles of sanitation.
 - i. Mention the various aspects you would keep in view when designing a sewer.
 - j. What do you understand by limiting velocity in sewers?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**
- a. What are the various methods to forecast the population growth in an area? Explain suitability of any four methods.
 - b. A storage reservoir is situated at a distance of 6 km from a city of 3 lakh population. The total loss of head from the source to the city is not exceed 20 m. taking the daily demand of 200 l/capita/day, pumping is to be done for 12 hours only, determine the size of supply main by
 - i. Darcy – Weisbach formula taking coefficient of friction as 0.015
 - ii. Hazen Williams formula taking $C = 130$. Assume minor losses = $10 V^2/2g$.
 - c. Describe the various methods of distribution of water and discuss the advantages and disadvantages of each.
 - d. Discuss the various steps involved in the design of a distribution system. What precautions should be taken to make design economical?
 - e. Explain the term sewer appurtenances. Why are sewer appurtenances necessary for a sewer line? Explain with neat sketches the working of any two sewer appurtenances that are usually provided on the sewer line.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**
- (a) What do you mean by air pollution? Write the causes, effect and prevention of air pollution.
 - (b) Write a note on various shapes of sewer sections.
A stone-ware sewer, 30 cm in diameter is laid at a gradient of 1 in 100. Using $N = 0.013$ in manning's formula, calculate the velocity and discharge when sewer is running full.

4. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What do you understand by ventilation of sewer? Why and how it is provided in sewer line? Describe the various methods employed for the ventilation of sewers/
 - (b) Differentiate between
 - i. Inlet and catch basin
 - ii. Manholes and lamp holes
 - iii. Siphon and inverted siphons.
5. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Over the two periods, each of 20 years population of a town increased from 30000 to 170000 to 300000. Find
 - i. Saturation population
 - ii. Coefficients of logistic equation
 - iii. Expected population in next 20 years
 - (b) What do you understand by per capita demand? How is per capita demand for a community estimated? Also explain the factors which affect the per capita demand.
6. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) What is meant by 'water hammer' and how it is produced in pipes conveying water under pressure? What precautions should be taken and arrangements made to reduce its effects?
 - (b) What are gravity and pressure conduits? Why pressure conduits are most commonly used for conveying water from distant sources to the town for supply?
7. **Attempt any *one* part of the following:** **10 x 1 = 10**
- (a) Write short note on the following:
 - i. Requirements of a good distribution system
 - ii. Hardy cross method
 - (b) Compare the merits and demerits of the 'continuous' and 'intermittent' systems of water supply. Under what conditions would you recommend the use of the latter? Write a note on the prevention of wastage of water in the distribution system.