



Printed Pages : 4

TCE – 601

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0057

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2006-07

ENVIRONMENTAL ENGINEERING - I

Time : 3 Hours]

[Total Marks : 100

- Note :**
- (i) Attempt *all* questions.
 - (ii) All questions carry *equal* marks.
 - (iii) Assume suitably any data not given.

1 Attempt any **four** parts of the following : **5×4=20**

- a) What is water demand? Briefly discuss various types of demands to be covered in a water supply scheme.
- b) Define per capita supply. Discuss the factors affecting per capita water consumption.
- c) The population of a town as per the census records is given in the following table :

<i>Year</i>	<i>Population</i>
1941	40,185
1951	44,522
1961	60,395
1971	75,614
1981	98,886
1991	1,24,230
2001	1,58,800

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Using incremental increase method, project the population of the town in the years 2021 and 2036 respectively.

- d) Enumerate various kinds of water sources and their characteristics. Discuss the importance of sanitary survey in ascertaining the fitness of a 'water source' as a 'source of water supply'.
- e) What is an intake? Mention the names of different components of an intake and highlight the considerations for its location and siting.
- f) With the help of neat sketches explain the salient features and working of 'Twin well type' and 'single well type' river intakes.

2 Attempt any **four** parts of the following : **5×4=20**

- a) With the rate of water consumption and fire demand being known, enumerate the hydraulic and economic considerations for determining the capacity and size of conduits.
- b) Using modified Hazen-William's formula, determine hydraulic gradient of a 2 m diameter smooth concrete pipe carrying a discharge of 3 m³/s of water at 20°C and having coefficient of roughness (**C_R**) as 1.0.
- c) List various types of pipe materials used in water supply and discuss important considerations in respect of choice of materials.
- d) Briefly summarize the laying, jointing and testing of cast iron pipes in water distribution networks.
- e) Distinguish between the following valves used in water supply in terms of their mode of working :

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- i) Air release valve and air inlet valve
- ii) Check valves and ball float valves.
- f) Discuss the common causes of water hammer encountered in water supply systems and suggest suitable remedial measures.

3 Attempt any **two** parts of the following : **10×2=20**

- a) Describe the following methods of water distribution highlighting their advantages :
 - i) gravitational system
 - ii) combined gravity and pumping system.
- b) Briefly summarize general design guidelines for water distribution system in respect of the following :
 - i) Peak factor
 - ii) Residual pressure
 - iii) Fire demand
 - iv) Minimum pipe sizes
 - v) Elevation of reservoir.
- c) Discuss the salient features, advantages and disadvantages of instantaneous electric geysers and storage geysers installed for hot water supply in buildings.

4 Attempt any **two** parts of the following : **10×2=20**

- a) Discuss the advantages and disadvantages of combined and separate systems of sewerage.

A population of 30,000 is residing in a town having area 60 hectares and piped water supply of 135 lpcd, with a peak factor of 2.5 in wastewater flow. If the average coefficient of run off for the area is 0.6 and the time of concentration of the design rain is 30 minutes, calculate the discharge for which the sewer of

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- a proposed combined system should be designed, if 80% of supplied water appears as sewage.
- b) Design a circular sewer to serve a population of 36,000 having the daily per capita supply 135 litres, of which 80% finds its way into the sewer. The slope available for the sewer to be laid is 1 in 625 and the same should be designed to carry four times the dry weather flow, when running full. Also determine the velocity of flow in the sewer, when running full.
Assume $n = 0.012$ in Manning's formula.
- c) Enumerate the conditions under which a small bore sewer system is considered suitable. Briefly describe its components and appurtenances highlighting the design criteria and limitations.
- 5** Attempt any **two** parts of the following : **10×2=20**
- a) What are the main sources of carbon monoxide in atmosphere? Discuss its adverse effects on human health and describe some important control measures to be adopted for the reduction of carbon monoxide emission in air.
- b) What is community noise? How is it different from transportation noise and individual noise? Write the values of acceptable outdoor noise levels in different types of residential areas as per the specifications prescribed by Bureau of Indian Standards.
- c) What is environmental impact assessment? Discuss its importance in the selection of alternatives for the implementation of a proposed action.