

Code No: RT32011

R13

SET - 1

**III B. Tech II Semester Regular/Supplementary Examinations, April -2018**  
**ENVIRONMENTAL ENGINEERING – I**  
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) What is meant by the term per capita demand? [3M]  
b) Differentiate between confined and unconfined aquifers. [4M]  
c) Define air valves. What is the purpose of providing air valves? [4M]  
d) Define specific conductivity of water. [3M]  
e) Define break point chlorination and double chlorination. [4M]  
f) What are the advantages of cast iron pipes? [4M]

**PART -B**

- 2 a) Mention and discuss the factors that influence per capita demand. [4M]  
b) What do you understand by continuous and intermittent system of water supply? What are their relative advantages and disadvantages? [8M]  
c) Explain the importance and necessity for planned water supplies. [4M]
- 3 a) Define an intake structure. What are the factors governing the location of an intake? [8M]  
b) Explain about pipe appurtenances which are provided at various suitable places along the pipe lines. [8M]
- 4 a) What are the common impurities found in natural sources of water, and explain their effects up on its quality. [8M]  
b) Explain about IS (Indian Standard) drinking water quality standards and WHO guidelines for drinking water. [8M]
- 5 a) Explain about operation and cleaning of slow sand filters. [8M]  
b) Design six slow sand filter beds from the following data: [8M]  
Population to be served = 50,000 persons.  
Per capita demand = 150 lt/head/day.  
Rate of filtration = 180 lt/hr/sq.m.  
Length of each bed = Twice the breadth.  
Assume maximum demand as 1.8 times the average daily demand. Also assume that one unit, out of six, will be kept as stand-by.
- 6 a) Explain about any three minor methods of disinfection. [8M]  
b) What are the various forms in which chlorine can be applied? Discuss. [8M]
- 7 a) Explain about grid iron system with neat sketch. [8M]  
b) Discuss about laying and testing of pipe lines. [8M]

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Time: 3 hours

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**PART -A**

- 1 a) What is the difference between arithmetic increase method and geometric increase method? [3M]  
b) What do you mean by perched aquifer? [4M]  
c) Define pressure relief valves. What is the purpose of providing pressure relief valves? [4M]  
d) Define BOD. [4M]  
e) Define super chlorination. [3M]  
f) What do you mean by socket and spigot joint? [4M]

**PART -B**

- 2 a) What are the factors governing the design period? [4M]  
b) Compute the population of the year 2000 and 2018 for a city whose population in the year 1930 was 25,000 and in the year 1970 was 47,000. Make use of geometric increase method. [8M]  
c) Explain about master plan method. [4M]
- 3 a) What are intake towers? Differentiate between dry and wet intake towers. [8M]  
b) Explain about the classification of river intake structures. [8M]
- 4 a) Explain about water borne diseases and their control. [8M]  
b) Explain about physical characteristics of water. [8M]
- 5 a) Explain about roughening and diatomaceous earth filters. [8M]  
b) Discuss about theory of filtration. [8M]
- 6 a) Explain about orthotolidine and D.P.D test. [8M]  
b) What are the methods of removing temporary hardness? Discuss in detail. [8M]
- 7 a) Explain about dead end system with neat sketch. [8M]  
b) What are the advantages and disadvantages of dead end system? [8M]

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SET - 3

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(Civil Engineering)

Time: 3 hours

Max. Marks: 70

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2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**  
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**PART –A**

- 1 a) Write a short note on provision for fire demand in water supply. [3M]
- b) What is the difference between aquifuge and aquitard? [4M]
- c) Define check valves. [3M]
- d) What do you mean by water borne diseases? Mention the names of diseases that are caused by bacterial and protozoal infections. [4M]
- e) Define zeolite. [4M]
- f) What is the purpose of providing expansion joints? [4M]

**PART –B**

- 2 a) Discuss the logistic curve method for determining the future populations of a locality. Derive a standard equation for such a curve and explain its use for determining the future population. [8M]
- b) In two periods each of 20 years, a city has grown from 40,000 to 1, 60,000 and then 2, 80,000. Determine (i) saturation population (ii) equation of logistic curve and (iii) expected population after the next 15 years. [8M]
- 3 a) Give an equation defining Darcy's law. What is its limitation? [8M]
- b) What are infiltration galleries and infiltration wells? Explain both with neat sketches. Also define a ranney well. [8M]
- 4 a) How does water quality criteria differs for industrial supplies from those for domestic municipal supplies? [8M]
- b) Explain why bacteriological test should be necessary in handling problems of water supply. [8M]
- 5 a) Differentiate between slow sand and rapid gravity filters. [8M]
- b) What are the advantages and disadvantages of pressure filters? [8M]
- 6 a) Explain about lime – soda process for removing hardness. [8M]
- b) Explain about desalination by electro dialysis method. [8M]
- 7 a) Explain the Hardy cross method used for pipe network analysis in water distribution system. [8M]
- b) What are the requirements of a good distribution system? [8M]

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Time: 3 hours

Max. Marks: 70

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3. Answer any **THREE** Questions from **Part-B**

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**PART –A**

- 1 a) What is meant by coincident draft? [3M]
- b) Define cyclonic precipitation. [4M]
- c) Define turbidity. [3M]
- d) What are the maximum acceptable limits of  
i)Turbidity ii)Fluorides iii)Nitrates and iv)Phenolic substances, in drinking water. [4M]
- e) Distinguish between slow sand and rapid sand filters with reference to method of cleaning. [4M]
- f) Define flexible joint and flanged joint. [4M]

**PART –B**

- 2 a) Explain the different methods of forecasting future population of a city for which a water supply scheme is to be planned. [8M]
- b) Given the following data, calculate the population at the end of next three decades by decreasing rate method. [8M]

| Year | Population |
|------|------------|
| 1940 | 80,000     |
| 1950 | 1,20,000   |
| 1960 | 1,68,000   |
| 1970 | 2,28,580   |

- 3 a) Enumerate the various surface sources of water, and discuss and compare the quality and quantity of water supplies that may be available from these sources. [8M]
- b) What are the factors governing the selection of dam site. [8M]
- 4 Explain about chemical characteristics of water. [16M]
- 5 a) Explain about working and cleaning of rapid gravity filters. [8M]
- b) Discuss about operational troubles in rapid gravity filters. [8M]
- 6 a) Explain about zeolite process for removing hardness. [8M]
- b) What do you mean by desalination? Explain about desalination by reverse osmosis process. [8M]
- 7 Explain about methods of distribution. Mention their advantages and disadvantages. [16M]

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