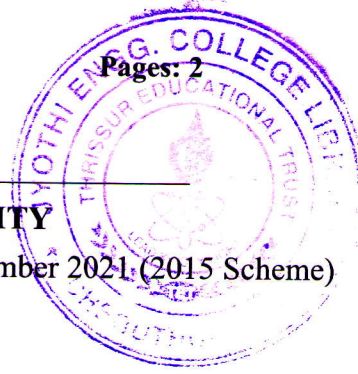


Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2021 (2015 Scheme)

**Course Code: CE405****Course Name: ENVIRONMENTAL ENGINEERING- I**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) What are the various types of water demand? (5)
- b) Estimate the population of the town for the year 2051 from the following data (10)
using arithmetic increase method and geometric increase method.

Year	1981	1991	2001	2011	2021
Population	80,000	1,00,000	1,45,000	2,00,000	2,40,000

- 2 a) With the help of neat sketches, explain any two types of intake structures. (10)
- b) What are the factors to be considered in deciding the location of pumping stations for water treatment plant? (5)
- 3 a) Explain the logistic curve method for modelling the future population of a city. (7.5)
- b) Describe any five water quality parameters and the permissible limits based on Indian standards. (7.5)

PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) Explain the theory of sedimentation. (6)
- b) Design a coagulation cum sedimentation plant for supplying water to the town having a population of 1,25,000. Average per capita demand is 135 litres/day/capita. The maximum demand may be taken as 1.5 times the average demand. Assume a detention period of 5 hours for settling tank and 30 minutes for flocculation chamber. Flow rate can be taken as 950 litres/hour/m² of plan area. (9)
- 5 a) Explain the construction and working of a rapid gravity filter with backwashing with the help of a neat sketch. (9)
- b) Explain the advantages and disadvantages of pressure filters (6)

- 6 a) Discuss the process of coagulation. Explain any two coagulants used for water treatment. (7.5)
- b) A city has a population of 25,000 with an average rate of demand as 150 litres/capita/day. Assume maximum demand as 1.8 times the average demand. Find the area of slow sand filters if the average rate of filtration is 175 litres/hour/m² of filter area. (7.5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Explain different types of chlorination. (8)
- b) Discuss any two methods adopted in water treatment to remove colour, taste and odour from water. (6)
- c) Explain the importance of fluoridation and defluoridation techniques in water treatment. Suggest methods for each technique. (6)
- 8 a) Illustrate with sketches the different layouts of water distribution network. (10)
- b) Explain Hardy Cross method for the analysis of complex pipe networks. (4)
- c) Write short notes on (i) Sluice valve (ii) Fire hydrant (iii) Water meter (6)
- 9 a) Explain lime soda process for removing hardness from water. (10)
- b) Combined gravity and pumping system is generally preferred for water distribution. Why? (5)
- c) What are the essential requirements of a good distribution system? (5)
