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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 20

Course Code: CE405

Course Name: ENVIRONMENTAL ENGINEERING

Max. Marks: 100

Duration: 3 Hours

Pages

PART A

Answer any two full questions, each carries 15 marks. Marks

- 1 a) Discuss the method of arriving at the quantity of water to be supplied to a (7) community.
 - b) Compare the different sources of water for selecting them as a source for a water ⁽⁵⁾ supply project.
 - c) Define MPN . Explain the significance of determining the same. (3)
- 2 a) Enlist any eight important chemical characteristics of raw water. Mention the (6) method of analysis and its acceptable value as per drinking water quality standards of any three of them.
 - b) The population of a city in three consecutive years i.e. 1991, 2001 and 2011 is (9) 80,000; 250,000 and 480,000, respectively. Determine (a) The saturation population, (b) The equation of logistic curve, (c) The expected population in 2021.
- 3 a) Define intake as referred in a water supply system and distinguish between Dry (8) intake and wet intake. Also list the important factors governing the selection of site for the selection of an intake
 - b) What are the points which needs consideration while selecting location for a (7) pumping station? Compute the cost of electric energy in a month for a pump which is operated 8 hours daily for 30 days, The pump lifts 93600 litres of water per hour against a total head of 25 m. Pump has an efficiency of 75% and the electric motor have an efficiency of 80%. The cost of electric energy is Rs 15 per unit.

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Distinguish between Type I and Type II settling of suspended particles. (4)
 - b) Describe any two mixing devices of coagulants with figure. (6)

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(5)

(4)

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- c) Find the diameter of the particles with specific gravity 1.2 removed in a tank (5) having a surface area of 250 m^2 , treating 10 MLd of water at 21° c.
- 5 a) Design a slow sand filter from following data.

Population to be served	=	50,000 persons
Per capita demand	=	150 Lpcd
Rate of filtration	=	180 L/hr./sq.m
Length of each bed	=	Twice the breadth

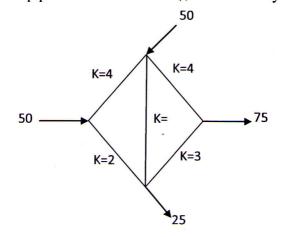
Assume maximum demand as 1.8 times the average daily demand. Also assume that one out of six will be kept as stand by.

- b) Design a clariflocculator to treat 6 MLd of water. Assume suitable data whereever (10) necessary.
- 6 a) Name any four commonly used coagulant in water treatment. What are the (5) factors which affect coagulant dosage.
 - b) With the help of a neat sketch explain the construction, working and back ⁽¹⁰⁾ washing of a rapid sand filter.

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Define disinfection. Enlist various methods of disinfection and mention where (6) they are suitable.
 - b) Explain various types of chlorination in water treatment ? (8)
 - c) Explain analysis of a water distribution system using Hardy Cross method. (6)
- 8 a) Discuss the purpose and methods of aeration in water treatment. (8)
 - b) Explain any three common methods employed in desalination of water. (6)
 - c) Explain equivalent pipe method in water distribution network design. (6)
- 9 a) Name the various types of water distribution systems.
 - b) Determine the distribution of flow in the pipe network shown in figure. The head (16) loss h_L , may be assumed as KQ^2 . The flow is turbulent and pipes are rough. The value of k for each pipe is indicated in the figure. Use Hardy-Cross method.



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