Total No. of Questions : 8]

SEAT No. :

PB-3744

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T.E. (Civil)

WATER SUPPLY ENGINEERING

(2019 Pattern) (Semester - I) (301002)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat figures wherever necessary.***
4) ***Assume necessary data.***
5) ***Use of scientific calculator is allowed.***

Q1) a) What is coagulation? Enlist the types of common coagulant? Why is it necessary? **[6]**

b) Design six units of slow sand filter for the following data : **[6]**

i) Population 50000

ii) Per capita demand 150 lit/cap/day

iii) Rate of filtration 180 lit/hr/sq. m.

iv) Length of each bed twice the breadth. Assume maximum demand of 1.8 the average daily demand, also assume that one unit is kept as a stand by.

c) What do you understand by flocculation? Why it is necessary? **[6]**

OR

Q2) a) A water treatment plant treats 300 m^3/hr of water. Design the circular Clariflocculator. Following parameters are expected to be designed i) Dimension of flocculator unit. ii) Power input by paddles to water. iii) Size and number of paddles. iv) Opening below flocculator. **[6]**

b) Explain the various filter troubles? How are they rectified? **[6]**

c) With neat sketch explain back washing of rapid sand gravity filter? **[6]**

P.T.O.

Q3) a) A filtered water discharge of 1 MLD has a chlorine demand of 4.8 mg/l. it is required to maintain a chlorine residual of 0.2 mg/l. Determine the quantity of bleaching powder necessary for six months (chlorine available 25 %)? **[6]**

b) Write short note on plain chlorination, post chlorination, super chlorination, and break point chlorination. **[6]**

c) Explain Zeolite process with neat sketch. **[6]**

OR

Q4) a) Alum dose of 20 mg/l is used to treat 50MLD of water workout quantity of alum required per month by the water treatment plant. Also calculate the amount of CO_2 released per day? **[6]**

b) State the various methods of desalination? Explain any one with sketch? **[6]**

c) State the various methods of removing excess fluorides from water? Explain any one in detail. **[6]**

Q5) a) Differentiate between grid iron system and dead-end system. **[4]**

b) Write the advantages of gravity and pumping system. **[4]**

c) Determine the balancing capacity of an ESR for a town having population 2 million and water supply rate of 280 lit/cap/l. the water is pumped continuously for 24 hr. breakup of demand is **[9]**

Time	Demand (lit/cap/l)
3 am - 9 am	80
9 am - 1 pm	50
1 pm - 7 pm	85
7 pm - 11 pm	30
11 pm -3 am	35

OR

Q6) a) A town with population of 2 lakh is to be supplied with water supply daily at 200 lit per head. The pumping is done from 6 am to 6 pm. The variation in demand is as follows: **[8]**

Time of the day	6 am -9 am	9 am -12 noon	12 noon - 3 pm	3 pm -6 pm	6 pm -9 pm
Demand	40%	10%	10%	15%	25%

Determine the capacity of the service reservoir by mass curve method.

b) State the various methods of distribution system? Explain any one. **[4]**

c) Explain water harvesting technology? **[5]**

Q7) a) What is packaged water treatment plant state the advantages of package water treatment plant? **[5]**

b) Explain the smart city mission and ATAL mission for rejuvenation and urban transformation mission. **[7]**

c) With sketch explain the one pipe system. **[5]**

OR

Q8) a) With sketch explain the Two pipe system. **[6]**

b) What is Jal Jeevan mission? State its implication in rural India. **[5]**

c) Why valves are provided in pipeline? State its types and explain any one with sketch? **[6]**

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