Total No. of Questions : 8]

SEAT No. : [ ]

PA-1423

[Total No. of Pages : 2

[5926]-39

T.E. (Civil)

WATER SUPPLY ENGINEERING

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

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3. or Q4, Q5 or Q6, and Q7 or Q8.***
2) ***Neat diagram must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary and clearly stae the same.***
5) ***Use of an electronic pocket calculator is allowed.***

Q1) a) What do you understand by loss of the head and negative head in a rapid sand gravity filter? What are the permissible values? What will happen if the negative head is excessive? **[10]**

b) Calculate the dimensions of rapid sand gravity filter for one lakh population with 200 l/c/d water supply. Assume rate of filtration as 100 $1/m^2/min$& mean size of sand 1.5mm. The terminal head loss is 2M. calculate depth of filter sand required if break throught index B=0.002. **[8]**

OR

Q2) a) On what factors the dose of Coagulants depends? How the optimum coagulant dose is determined? **[3+3=6]**

b) Enlist minimum 4 coagulants used. Explain any 01 in detail. **[2+4=6]**

c) Explain with a neat sketch: Working principle of tube settler. **[2+4=6]**

Q3) a) The water works of a town of population 25,000 has to meet its water demand at the rate of 135 l/c/d. If the disinfection is to be done by bleaching powder having 45% available chlorine, determine the quantity of bleaching powder required per year. The required dose of chlorine at the water work is 0.3 ppm for disinfection. **[5]**

b) Explain in detail: use of Nano technology in water treatment. **[5]**

c) Explain with suitable chemical reactions: use of chlorine as disinfectant and importance of pH in chlorination. **[7]**

OR

P.T.O.

Q4) a) State the various methods used for softening of water. State their advantages & disadvantages. **[8]**

b) What do you understand by desalination? Why it is necessary? Explain the electrodiaylsis method of desalination. **[9]**

Q5) a) What is meant by balancing capacity of reservoir? How it is determined? **[6]**

b) Designed demand of the town is 5 MLD. It is pumped into an elevated service reservoir at a uniform rate from 5am to 9 am & 5pm, to 9pm. The variation in consumption of water is given below. **[6]**

Period	5am to 9am	9am to5pm	5 pm to 9pm	9pm to12 am	12 am to 5 am
06 Consumption	40%	15%	30%	10%	05%

Determine the balancing capacity of the reservoir.

c) Illustrate use of GIS and drone technology in water management with two examples. **[3+3=6]**

OR

Q6) a) Explain in detail: leak detection techniques as an important tool in water supply engineering. **[6]**

b) Explain with a neat sketch : Roof top rain water harvesting. **[2+4=6]**

c) Explain in detail: components of RWH system. **[6]**

Q7) a) Explain with example : Jal Jeevan Mission and its impact in rural India before and after its implementation. **[9]**

b) Draw a flowchart of package water treatment plant and explain in brief its unit operation and process. **[8]**

OR

Q8) a) Write and explain various kinds of fixtures and fittings used for water saving. **[9]**

b) write detailed notes on : **[4+2=8]**

i) SMART city mission

ii) AMRUT