

Total No. of Questions : 8]

SEAT No. :

P-7505

[Total No. Of Pages : 3

[6180]-12

**T.E. (Civil Engineering)**

**WATER SUPPLY ENGINEERING**

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

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates :*

- 1) *Neat diagrams must be drawn wherever necessary.*
- 2) *Use of Calculator is allowed.*
- 3) *Assume Suitable data if necessary.*
- 4) *Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8*

**Q1) a)** Differentiate between coagulation and flocculation by considering different points. **[6]**

b) A clariflocculator is to be designed for an average flow of 50 MLD. Assuming, inlet velocity as 1.2 m/s, and detention time in flocculator and clarifier as 30 min and 120 mins, respectively, surface overflow rate in clarifier as 40 m<sup>3</sup>/m<sup>2</sup>/d, G in flocculator 40 s<sup>-1</sup>, and depth of flocculator basin as 2.5 m, determine diameter of inlet pipe, flocculator and clarifier.

**[6]**

c) Discuss in details various mechanisms involved in the filtration process. **[6]**

**OR**

**Q2) a)** What is Flocculation? State factors affecting the flocculation. **[6]**

b) A filter unit is of size 4m × 8m. After filtering 8000 m<sup>3</sup>/day in 24 hr period, the filter is back washed for 30 minutes at the rate of 10 lit/m<sup>2</sup>/sec for 10 minutes. Compute the average filtration rate, quantity and percentage of treated water used in washing and the rate of wash water flow in each trough. The unit has 4 collecting troughs. **[6]**

c) Explain in detail: operational problems of RSG filter. (Min 03 to be explained) **[6]**

**P.T.O**

- Q3) a)** Enlist various methods of disinfection. Explain any two methods in detail. [6]
- b) What is Residual Chlorine? Find the dose of chlorine and chlorine demand for water quantity of 40,000 m<sup>3</sup>/day. Chlorine used is 15 kg per day and residual chlorine after 10 minutes of contact time is 0.2 mg/ lit. [6]
- c) Write with a neat sketch, a detailed note on Reverse Osmosis [2 + 3 = 5]

**OR**

- Q4) a)** Explain in detail: fluoridation & defluoridation of water. [6]
- b) Explain in detail: Super chlorination, Dechlorination, Prechlorination [6]
- c) Write with a neat sketch: a detailed note on Electrodialysis. [2 + 3 = 5]
- Q5) a)** Write in detail: any 02 methods of water distribution. Support your answer with a suitable sketch. [8]
- b) Designed demand of a town is 3 MLD. It is pumped into an elevated service reservoir at a uniform rate from 5 am to 9am and 5pm to 9pm. The variation in demand of water is given below. [10]

Period	5 am to 9 am	9 am to 5 pm	5 pm to 9 pm	9 pm to 12 am	12 am to 5am
demand	40%	15%	30%	10%	05%

Determine the balancing Capacity of the reservoir.

**OR**

- Q6) a)** Write difference between continuous and intermittent system. (Min 06 points of comparison are expected) [6]
- b) Calculate the storage capacity and dimensions of the tank to store rain water for the given data: [6]
- Terrace area = 200 m<sup>2</sup>, average annual rainfall = 720 mm
- Runoff coefficient = 0.8, Assume L:B = 2, D = 2m
- c) Write a detailed note on detection and prevention of leakage. [6]

- Q7)** a) Write a note on: 1) Gate valve, 2) Pressure relief valve [6]
- b) Explain in detail Packaged WTP [5]
- c) Explain with neat sketch: one pipe system partially ventilated. [6]

**OR**

- Q8)** a) Write a note on: 1) Reflux valve, 2) Air relief valve [6]
- b) Explain in detail with neat sketch: two pipe system. [5]
- c) Enlist initiatives taken by Government in water infrastructure. Explain one of them in detail. [6]

