

**002707**

**Dec. 2021**

**B.Tech. (Civil) - VII SEMESTER**

**Water Quality Engineering (PEC-CEEL-401-1)**

Time : 90 Minutes]

[Max. Marks : 25

*Instructions :*

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
2. *Answer any three questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

**PART - A**

1. (a) Give the maximum acceptable limits of the following for the public drinking water: Hardness and Colour. (1)
- (b) Write short notes on Equalization of waste water. (1)
- (c) Write short notes on Proportioning of flow? (1)
- (d) What is Neutralization of waste water? Discuss various methods of Neutralization. (1)
- (e) What is Flocculation? (1)

- (f) What are the objectives of water treatment? (1)
- (g) Define: Surface Overflow Rate. (1)
- (h) Explain the following: Detention Period. (1)
- (i) Discuss the adverse effect of industrial effluents discharge on land in sewerage systems. (1)
- (j) Draw a curve of total residual chlorine versus applied chlorine dose. (1)

### PART - B

- 2. (a) Name common impurities present in a river? Give their sources of contribution and explain their adverse effects on various uses of water. (3)
- (b) State the permissible limits for fluorides in water to be supplied for domestic consumption. Mention the ill-effects when they are not in the permissible limits. (2)
- 3. (a) Define industrial waste water. How is it different from domestic sewage? (2)
- (b) Name various bacteriological tests used for assessing drinking water quality and explain multiple tube fermentation technique in detail. (3)

- 4. What is Turbidity? Name various methods of turbidity measurement and explain any *one* method in detail. (5)
- 5. (a) What is Coagulation? Name the common coagulants and Explain how alum helps in the removal of impurities. (3)
- (b) The analysis of water from a well showed the following results in mg/l :  
 $Ca = 65$ ,  $Mg = 51$ ,  $Na = 101.5$ ,  $K = 21.5$   
 $HCO_3 = 248$ ,  $SO_4 = 221.8$ ,  $Cl = 79.2$   
 Find the total hardness, carbonate hardness and non-carbonate harness. (2)
- 6. (a) A settling tank is designed for an overflow rate of 4000 litres per  $m^2$  hour. What percentage of particles of diameter (a) 0.05 mm, will be removed in this tank at  $10^\circ C$ . (2)
- (b) In a continuous flow settling tank 3 m deep and 60 m long, what flow velocity of water would you recommend for effective removal of 0.025 mm particles at  $25^\circ C$ . The specific gravity of particles is 2.65 and kinematic viscosity for water may be taken as  $0.01 \text{ cm}^2/s$ . (3)