



10CV61

**Sixth Semester B.E. Degree Examination, Aug./Sept.2020**  
**Environmental Engineering - I**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.**

**PART - A**

1. a. Discuss the environmental pollution due to human activities. (05 Marks)  
b. What is meant by design period? List and discuss the factors that affect the design period. (06 Marks)  
c. In two periods of each 20 years, a city has grown from 30,000 to 1,70,000 and then to 3,00,000. Determine the following : i) The saturation population ii) Equation of Logistic curve iii) The expected population after next 20 years. (09 Marks)
2. a. List the surface and sub - surface sources of water. Explain with neat sketch types of springs. (08 Marks)  
b. A centrifugal pump driven by an electric motor lifts water through a total height of 50m from the reservoir to the discharge end. The pump efficiency is 77% and the motor efficiency is 85%. The lift is through 300m length of 10cm diameter pipe and pumping rate is 1500 litre/minute. If  $4f = 0.025$  and power costs 25 paise per KWh , what is the cost of power for pumping 04 million litres of water. (12 Marks)
3. a. What are water borne diseases? Name the different water borne diseases caused by bacteria, viruses and protozoa. (06 Marks)  
b. In a water treatment plant, the pH values of incoming and outgoing waters are 7.2 and 8.4 respectively. Assuming a linear variation of pH with time, determine the average pH value of water. (08 Marks)  
c. Explain Physical , Chemical and Micro biological characteristics of water. (06 Marks)
4. a. Define Aeration process. Explain the methods of aeration. (08 Marks)  
b. Explain i) Detention time ii) Surface loading rate. (04 Marks)  
c. The maximum daily demand at a water purification plant has been estimated on 12 MLD. Design the dimensions of a suitable sedimentation tank (Fitted with mechanical sludge removal arrangements) for the raw supplies, assuming a detention period of 6 hours and the velocity of flow as 20cm per minute. (08 Marks)

**PART - B**

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5. a. Explain Theory of Filtration. (08 Marks)  
b. What are the types of filters? Explain with neat sketch, working and cleaning of slow sand filters. (12 Marks)
6. a. List the methods of disinfection. Explain any two of them. (10 Marks)  
b. Explain Zeolite process of water softening writing the chemical reactions involved. Draw the neat sketch of Zeolite water softener. (10 Marks)

- 7 a. What is meant by Defluoridation? Explain with a line diagram the "Nalagonda technique of defluoridation. (08 Marks)
- b. List the methods of water distribution system. Discuss in detail any one of them. (08 Marks)
- c. List the various layouts used in water distribution networks. (04 Marks)
- 8 Write short notes on any four of the following :
- a. Five hydrant.
- b. Break point chlorination.
- c. Pressure filter.
- d. Per capita demand.
- e. Intake structure. (20 Marks)

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