

**IV B.Tech I Semester Supplementary Examinations, July/Aug - 2021****ENVIRONMENTAL ENGINEERING - II****(Civil Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B***\*\*\*\*\*****PART-A (14 Marks)**

1. a) Define the terms Sewage and Sullage. [3]
- b) Define Pumping Station. [2]
- c) Define BOD and COD. [2]
- d) What is Suspended Growth Process? [2]
- e) Define Nitrification and Denitrification. [3]
- f) What is sewage sickness? [2]

**PART-B (4x14 = 56 Marks)**

2. a) Mentions various merits & demerits of collection and conveyance of waste water? [7]
- b) A circular sewer of 45cm diameter was designed for a town of population 30,000. The sewer was designed to carry 3.5 times of the dry weather flow. What slope should be provided to the sewer when running full? Value of  $n=0.012$  in manning's equation. Assume other relevant data suitably. [7]
3. a) Under what circumstances is pumping of sewage necessary? What types of pumps are recommended for pumping sewage? Why? [7]
- b) Discuss about sanitary fittings and other accessories of house hold plumbing. [7]
4. a) Explain the procedure of estimating BOD of a given sample of sewage. [7]
- b) Explain the design of primary sewage treatment units. [7]
5. What is activated sludge treatment process? Mention all the design parameters required to design activated sludge operation unit [14]
6. a) Discuss various methods on removal of phosphates. [7]
- b) How do Imhoff tanks differ from septic tanks in principle of operation? Mention the advantages & disadvantages of imhoff tanks. [7]
7. a) What do you mean by thickening of sludge? Explain the handling and treatment of sludge thickening. [7]
- b) Mention the disposal standards of sewage characteristics into the water bodies according to pollution control board of India? [7]