G1 Dr. Dharmendra, Civil Roll No.: 55

National Institute of Technology, Hamirpur (H.P.) 1/12/2022
B.Tech End Term Examination, 01-12-2022 (session) E

Branch: Civil Engineering Semester: 5th Semester

Course Name: Water Supply and Treatment Course Code: CE – 312
Time Allotted: 3 Hours Maximum Marks: 50

Note: 1) Assume Suitable data wherever necessary.
2) All the parts of each section should be answered at one place and in proper sequence as per the question paper.

In case of haphazard answering of questions, 3 marks will be deducted from the total marks scored by a candidate.

Q.1 i. Mention the factor affecting water demand?

ii. Define hard and soft water? Write down causes of hardness? Is it advisable to remove all the hardness from drinking water?

iii. Suggest different types of treatment units required and their process for treatment of surface water with turbidity exceeding 50 NTU laden with algae or other microorganisms. (3+3+4=10)

Q.2 Classify different types of intake structures? What are important considerations which govern during selection of site of an intake? Design a river intake with respect to number of bars and size of the openings in the intake well with the following given data

i. Population to be served =50,000; ii. Average water demand = 200 l.p.h. iii. Pumping hrs. = 16;
iv. Velocity through the bar = 0.16 m/s. (2+3+5=10)

Q.3 Describe principle of settling tank? Prove that theoretically the surface loading (Q/A) is a measure of effective removal of particle rather than depth in a sedimentation? Calculate volume of a sedimentation tank to accommodate 2.5hr detention time and a flow rate of 5MLD. Assuming suitable data calculate dimension of water in tank? (10)

Q. 4 Describe the various processes and mechanism involve in the filtration unit? Compare between the slow sand and rapid sand filter? Calculate the amount of water that can be treated in a day using a square filter of 5 m side dimension with a filter rate of $3L/m^2.s$? (10)

Q.5 What are different types of disinfection used in water supply? Explain chemistry of chlorination and breakpoint chlorination with help of neat sketch. How different organic and inorganic interfering during chlorination explain with their implications? (10)

or

Q.5 i. Compare the merits and demerits of the continuous and intermittent system of water supply.
ii. Illustrate with neat sketches the different types of layouts of pipe systems in distributing water, and compare their comparative merits and demerits. (10)