JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2021

B.Tech III Semester

COURSE CODE: 18B11CE314   MAX. MARKS: 35

COURSE NAME: Water Supply Engineering

COURSE CREDITS: 03   MAX. TIME: 2 Hours

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be*

treated as case of unfair means.

1. Design a RSF unit along with an *under drainage* system represented by a neat sketch to treat a flow of 25 MLD. Assume suitable design parameters. **(6)**

2. A settling column analysis is run on suspension type-I which is having a height of 2.4 m and the Initial concentration of well mixed sample of 750 mg/l. Results of the analysis are shown below. Determine (a) theoretical efficiency if the loading rate is 2.8×10^{-2} m/min. **(4)**

Time (min)	0	58	77	91	114	154	250
Conc'n remaining (mg/l)	750	660	515	425	315	230	152

3. Determine the annual quantity of alum and quicklime for a treatment plant of capacity 50MLD. The alum dose is 30ppm and the alkalinity of raw water is 6 mg/l of $CaCO_3$. Assume both the chemicals have 75% purity levels.
Given MW of (Al = 27, Ca = 40, O = 16, H = 1, C = 12, S = 32) **(3)**

4. A rectangular sedimentation tank is required to treat a flow of 4.5 MLD. The size of the tank is 20x6x3.5m. If 100 ppm suspended solids are present in water and assuming 70% as removal efficiency for particles having specific gravity of 2.5. Determine (a) average flow of water through the tank (b) Detention time (c) overflow rate and (d) deposition of solids in the tank **(4)**

5a) A town has a population of 80,000 with a demand rate of 150 lpcd. The disinfection process has been carried out using bleaching powder having 40% available chlorine. The chlorine dose was determined to be 0.6 ppm. Determine the annual requirement of bleaching powder **(3)**

5b) With a neat sketch, explain the principle of break-point chlorination. **(3)**

5c) In a neat tabular format, show and explain how increasing pH value reduces the effectiveness of free chlorine (from HOCl) **(3)**

6. Discuss the advantages and disadvantages of Dead End System for water distribution network. **(4)**

7. In the context of filtration process, discuss (a) the importance of backwashing and (b) operational problems associated with the filtration process **(5)**