

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2022

B. Tech. (CE), Semester VII, 2022-2023

Roll No.....

Public Health Engineering CE1201

Time: 3 hours

Max. Marks: 60

Instructions to students:

1. Do not write anything other than your roll number on question paper.
 2. Mention all the assumptions for your answers clearly.
 3. Marks are indicated against each question.
 4. Answer ALL the questions.
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Q.1 (a) How will you design a typical gravity flow filter ? Explain with the help of suitable neat and clean diagram.

5 Marks

(LOs 3,4)

Q.1 (b) Draw the various "Water distribution network "to supply a community with the appropriate quantity and quality of water.

5 Marks

(LOs 2,3)

Q.2 (a) Differentiate between Displacement pump and Centrifugal pumps.

5 Marks

(LOs 1,2)

Q.2 (b) Define water demand. How will you categorize the water requirements for different usage?

5 Marks

(LOs 2,3)

Q.3 (a) Discuss the broad characteristics of the untreated sewage and also write the significance of various parameters of sewage in designing Sewage Treatment plant (STP).

5 Marks

(LOs 1,2,3)

Q.3 (b) What are the pollutants that should be removed before the sewage is considered safe for discharging back to water body?

5 Marks

(LOs 1,2,3)

Q.4 (a) Screen is the first unit operation in wastewater treatment plant. The screens are used to protect pumps, valves, pipelines, and other appurtenances from damage or clogging by rags and large objects. Classify the screen depending upon the opening size provided and also write the requirements and Specifications for Design of Bar Screen.

3 Marks
(LOs 3,4)

Q.4 (b) Design a Bar Screen Chamber for average sewage flow of 20 MLD, minimum sewage flow of 12 MLD and maximum flow of 30 MLD. Take following assumptions:

- Assume manual Cleaning
- Angle of inclination of bar with horizontal is 30^0
- Assume bar size: 9mm $\times$ 50 mm $\times$ 9 mm facing the flow
- Bar Spacing provided is 30 mm
- Number of bars provided is equal to 30

7 Marks
(LOs 3,4)

Q.5 (a) Why are Grit chambers provided in Wastewater treatment plants (WWT) ? Considerable quantities of grit material collected at the sewage treatment plant site then how will you dispose collected grit material at STP site.

3 Marks
(LOs 3,4)

Q.5 (b) Design a grit chamber for population 50000 with water consumption of 135 LPCD. Assume the following data as:

- Sewage generation= 80% of water supply
- Horizontal velocity = 0.2 m/s
- Detention time period = 60 Seconds

7 Marks
(LOs 3,4)

Q.6 (a) What is the purpose of providing primary sedimentation tank in wastewater treatment? What is the expected BOD and SS removal in primary sedimentation tank?

3 Marks
(LOs 3,4)

Q.6 (b) Design a Primary settling tank to treat wastewater with average flow rate of 10 MLD and peak flow of 22.5 MLD. Assume the following data as:

- Detention time = 1.5 h
- Width= 6.0 m

7 Marks
(LOs 3,4)

all the best!