Code No: V3202 **R07** **Set No: 1**

III B.Tech. II Semester Supplementary Examinations, December - 2012
ENVIRONMENTAL ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) What is the importance of fluctuations in water demand in the design of a water supply schemes?
   b) The census records of a town are given. Estimate the population of the town in 2041 assuming Incremental increase and Geometric growth methods. (8+8)

Year	1981	1991	2001	2011
Population	76,000	87,000	105,000	1,41,000

2. a) Explain the various features of a river intake with the help of a sketch.
   b) What are various methods of water distribution? What are the criteria for choosing a particular method? (8+8)

3. a) Describe the various outlet arrangements of a sedimentation tank with neat sketches.
   b) What are coagulant aids? How they are useful in enhancing the efficiency of coagulation? (8+8)

4. a) Describe the working of a Slow sand filter with the help of neat sketch.
   b) What are the advantages and disadvantages of chlorination when compared to other disinfection practices? (8+8)

5 a) Write short notes on check valve with the help neat sketch?
   b) What are the various components of pump house in a water supply scheme? Explain. (8+8)

6. a) What is time of concentration? What is its significance?
   b) The one day and two day BOD of a sewage sample at 30^0 C are 120 mg/l and 180 mg/l respectively. Calculate the 5 day BOD at 20^0 C. (8+8)

7 a) Draw the general layout of a domestic sewage treatment plant. Explain the functioning of each unit.
   b) What is a trickling filter? What are its advantages and disadvantages? (8+8)

8 a) Design an oxidation pond for a small colony of 300 residents. Assume suitable data.
   b) What are Soak pits? Why are they required for a septic tank? (8+8)

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Code No: V3202 **R07** **Set No: 2**

III B.Tech. II Semester Supplementary Examinations, December - 2012
ENVIRONMENTAL ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) What are the various physical tests conducted on water? What is their importance?
   b) What is fire demand? Give any two empirical formulae and their suitability for estimation of fire demand. (8+8)

2. a) Compare the various sources of water with respect to physical quality considerations. Which is the best source in your opinion?
   b) What are the advantages and disadvantages of Dead End System? (8+8)

3. a) What are the various design parameters of a sedimentation tank? What is the significance of each of them?
   b) Describe the dry feeding arrangement of coagulant with the help of a neat sketch. (8+8)

4. a) What is break point chlorination and its importance in the chlorination of water?
   b) What are the advantages of Multimedia Filters? (8+8)

5 a) Explain flanged joint with the help of a neat sketch. When is it suitable?
   b) How do you analyse a pipe network using Equivalent pipe method? (8+8)

6. a) What is two pipe system of house drainage? Explain with the help of a line diagram?
   b) What is sewage farming? Discuss its suitability. (8+8)

7. a) Design a screening chamber for a town of 2 lakh population. Assume the data required suitably.
   b) What are factors affecting sludge digestion? (8+8)

8. a) What is sludge digestion? Describe the process of sludge digestion
   b) Design a septic tank for a small colony of 100 residents. Assume the data suitably. (8+8)

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Code No: V3202 **R07** **Set No: 3**

III B.Tech. II Semester Supplementary Examinations, December - 2012
ENVIRONMENTAL ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) What do mean by protected water? How do you ensure the supply of protected water to the community?
   b) What are the chemical quality requirements of drinking of water? (8+8)

2. a) What are the infiltration galleries? What are its advantages? (8+8)
   b) What are the requirements of minimum pressure in a distribution system?

3. a) Design a sedimentation tank that can remove all particles of size 0.03 mm with a specific gravity of 2.65. Take kinematic viscosity of water as 0.01 cm^2.
   b) Describe various mixing units used for flocculation. (8+8)

4. Design a rapid sand filter to treat a flow of 25 MLD of water with a rate of filtration of 100 m^3/m^2/day under normal operation. The rate of filtration should not exceed 150 m^3/m^2/day when one filter is under backwash and should not exceed 200 m^3/m^2/day when one filter is under backwash and another under repair. (16)

5. a) What are the various test to be conducted on a water pipe line? Explain them in brief. (8+8)
   b) Explain the functioning of a Sluice Valve with the help of a neat sketch.

6. a) Why is inverted siphon designed normally with three barrels? Explain.
   b) Calculate the velocity of flow and discharge in a sewer of circular section having diameter of 0.7 m laid at a gradient of 1 in 500. Take Manning's N as 0.012. Assume that the sewer is running half full. (8+8)

7 a) Design a grit chamber for a city of 10 lakh population. Assume the appropriate data required. (8+8)
   b) Discuss the advantages and disadvantages of various types of aerators.

8 a) Explain the design procedure of an oxidation pond.
   b) Write in brief about sludge drying beds. (8+8)

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Code No: V3202 **R07** **Set No: 4**

III B.Tech. II Semester Supplementary Examinations, December - 2012
ENVIRONMENTAL ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) What is per capita water demand? What are the factors affecting it? (8+8)
   b) What are the factors affecting the design period of a water supply scheme?

2. a) What is combined pumping and storage method of supply of water? Explain its use with the help of a sketch?
   b) What are different layouts of water distribution system? Describe the features of Grid Iron system in brief? (8+8)

3. a) Show that the efficiency of a rectangular sedimentation tank is independent of depth and depends only on surface overflow rate.
   b) Calculate the detention period and velocity gradient to mix a flow of 75 MLD. The tank volume is 18.4 m^3 and the capacity of the mechanical mixer is 5 kW. The temperature of water is 10° C and the dynamic viscosity of water at 10°C is 1.3 $X10^{-3}$ Pascal-Sec. (8+8)

4. a) What is the various troubles in operation of rapid sand filters? What are the remedial actions?
   b) What is Super-chlorination? Why is De-Chlorination required after Super-Chlorination? (8+8)

5 Calculate the storage capacity of a service reservoir for a daily requirement of 3,50,000 liters. The pumping is done at a constant rate from 6 a.m. to 6 p.m. continuously. The consumption is as follows.

7 a.m. to 8 a.m.	30% of daily demand
8 a.m. to 5 p.m.	25% of daily demand
5 p.m. to 8 p.m.	30% of daily demand
8 p.m. to 7 a.m.	15% of daily demand

(16)

6. a) What are the various pumps used for pumping wastewater? What are their special requirements?
   b) What are the locations where manholes are necessary? Describe a manhole with the help of a neat sketch. (8+8)

7. a) Where do you require a Skimming tank? What is the working principle of a Skimming tank?
   b) Describe the construction features a trickling filter. (8+8)

8. a) Discuss the design criteria of sludge digestion tank.
   b) Design a septic tank for a small colony of 200 residents. Assume the data suitably. (8+8)

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