Code :R7320102 1

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
ENVIRONMENTAL ENGINEERING-I
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) State the importance of treating water for public supply.
   (b) A water supply scheme has to be designed for a city having a population of 1,00,000. Estimate the important kinds of drafts which may be required to be recorded for an average water consumption of 250 lpcd. Also record the required capacities of the major components of the proposed water works system for the city using a river as the source of water supply. Assume suitable data where needed.
2. (a) Compare Surface and Ground waters as source of water supply from the con- side rations of quantity and quality.
   (b) Explain the general methods of distribution of water employed in municipal water supply schemes.
3. (a) Describe in brief various unit operations for chemical clarification along with the design recommendations.
   (b) Enumerate and discuss the various methods which are adopted collectively for treating public water supplies drawn from a perennial river.
4. (a) Explain the working of a Rapid sand filter with a neat sketch.
   (b) Design a set of slow sand filters to treat 2 million liters per day of water. Give the dimensioned sketch and explain how it works.
5. Write a detailed note on the detection and prevention of wastage of water in the distribution system?
6. What do you mean by variation in flow of sewage? Explain average flow, dry weather flow, and maximum flow?
7. State the common laboratory tests conducted on sewage and their importance in the treatment and disposal of sewage.
8. Design a septic tank for 200 users. Water allowance is 120 litres per head per day. Detention period may be taken as 8 hours. Draw a neat dimensioned sketch of the septic tank you design.

⋆ ⋆ ⋆ ⋆ ⋆

Code :R7320102 **2**

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
ENVIRONMENTAL ENGINEERING-I
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) State objectives to be kept in view in designing a water supply system.
   (b) The populations of 5 decades from 1960 to 2000 are given below in table. Find out the population after one, two and three decades beyond the last known decade, by using Geometric increase method.

Year	1960	1970	1980	1990	2000
Population	25000	28000	34000	42000	47000

2. (a) Enumerate the various forms in which ground water occurs in nature. Discuss briefly the exploitation of its most important source.
   (b) What are infiltration galleries and infiltration wells? Explain with the help of neat sketches.
3. (a) Define flowing through period and detention period in a sedimentation basin.
   (b) Prove that the area and overflow rates rather than the detention period govern the design of a settling tank.
4. (a) Write a detailed note on troubles in operation of Rapid sand filter.
   (b) Calculate the area of filtering media required for treating water by means of Rapid sand filters giving the data:
   Population: 80000, Rate of supply: 200 lpcd,
   Maximum demand: 1.5 times the average, Assume suitable rate of filtration.
5. What do you understand by Continuous and intermittent supply systems of water? Compare both with respect to their merits and demerits?
6. Differentiate between 'Sewage' and 'Drainage'? Discuss the Rational formula for calculating the peak drainage discharge from a given Catchment and reaching a particular storm water drain up to a particular point.
7. Give a list of methods available for treatment of sewage for both rural and urban conditions.
8. What do you understand by digestion of sewage sludge? Give a neat sketch of separate digestion tank and explain its working?

⋆ ⋆ ⋆ ⋆ ⋆

Code :R7320102 **3**

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
ENVIRONMENTAL ENGINEERING-I
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Discuss in detail the merits and demerits of the various methods adopted for estimating the future population of a city.
   (b) The populations of 5 decades from 1960 to 2000 are given below in table. Find out the population after one, two and three decades beyond the last known decade, by using Incremental increase method.

Year	1960	1970	1980	1990	2000
Population	25000	28000	34000	42000	47000

2. (a) What are springs and how are they formed? Discuss the various types of springs.
   (b) Describe an artesian well, and how is it formed.
3. (a) Describe the constituents of a coagulation -sedimentation plant.
   (b) Design a rectangular sedimentation tank to treat 3780 m^3/day of coagulated water. Make necessary assumptions. Sketch the inlet, out let and sludge removal arrangements.
4. (a) Compare the design and working features of the slow sand filter and pressure filter.
   (b) Design slow sand filters for a village with 10000 population, assuming suitable data. Give the plan and section of the filter.
5. What factors effect the pressure in pipe lines of distribution system? What pressures are usually adopted for various pipes? What points should be kept in mind while designing pipe lines?
6. What are the different hydraulic elements and the relation that exists between them, which govern the discharge through a sewer?
7. Differentiate between aerobic and anaerobic treatment of sewage, giving major end products? Name one treatment method in each category.
8. Compare and contrast septic tank with Imhoff tank and clarigester, in scope, function and performance.

⋆ ⋆ ⋆ ⋆ ⋆

Code :R7320102 4

III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
ENVIRONMENTAL ENGINEERING-I
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Describe the role of various agencies in the planning and development of water supply system.
   (b) Given the following data, calculate the population at the end of next three decades by Arithmetic increase method.

Year	1970	1980	1990	2000
Population	80000	120000	168000	228580

2. (a) Differentiate between confined and unconfined aquifers.
   (b) Describe the various types of wells.

3. (a) Enumerate the chemicals which are used for coagulation. Discuss their comparative merits and demerits.
   (b) Prove theoretically that the surface loading and not the depth is a measure of effective removal of particles in an ideal sedimentation tank. Mention the assumptions made in theory.

4. (a) Compare the design and working features of the rapid sand filter and pressure filter.
   (b) Design a set of rapid sand filters for treating water required for a population of 50000. The rate of supply being 180 lpcd. The filters are rated to work at 5000 liters/hour/sq.m. Assume any other suitable data required.

5. Write short notes on various types of service reservoirs.

6. Describe the method of estimating sanitary sewage of a city in detail.

7. What is the object of sewage treatment? Distinguish between fresh sewage, stale sewage and septic sewage?

8. Write in detail about the construction of Oxidation Pond.

⋆ ⋆ ⋆ ⋆ ⋆