Code No: **RT41011** **R13** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

ENVIRONMENTAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) What are the considerations while finalizing the type of sewerage system? [4]
   b) What is plumbing and its importance? [3]
   c) What do you understand by the following terms (i) sewage (ii) sullage [4]
   d) Describe the purpose of the aeration system. [3]
   e) Define Nitrification and Denitrification. [4]
   f) Analyze the role of sludge management in Sewage Treatment. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Describe in brief various types of water carriage systems. [8]
   b) Explain in detail various patterns of collection system. [8]

3. a) Explain in detail how pumping of sewage is different than pumping fresh water? [8]
   b) Describe the criteria for selection of site for pumping station. List out the facilities/ accessories required in the pumping station? [8]

4. a) Explain in detail the important characteristics of sewage. [10]
   b) Explain sedimentation process in detail. [6]

5. a) Briefly discusses the differences between aerobic and anaerobic biological treatment processes and subsequently focuses on selection of aerobic biological treatment processes. [10]
   b) List the basic components of an activated sludge system and explain them. [6]

6. a) With neat sketch, explain about septic tank. [8]
   b) Design a septic tank for a small colony of 200 persons with daily sewage flow of 120 lpcd. [8]

7. a) Discuss with a neat sketch the oxygen-sag curve and its importance. [8]
   b) List the various methods of sludge thickening. Describe with the help of neat sketch gravity-sludge thickener. [8]

Code No: **RT41011** **R13** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

ENVIRONMENTAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Describe merits and drawbacks of separate system, partially separate system. [4]
   b) What is plumbing design? [3]
   c) How is BOD measured and calculated? [4]
   d) List out the differences between Aerated Laggons and Activated sludge. [4]
   e) Explain the Sources of Phosphates Entering Water Reservoirs. [4]
   f) What is sewage sickness? [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the operation and maintenance of sewers. [8]
   b) What do you understand by the following terms (i) sewage (ii) sullage (iii) sewer and (iv) sewerage [8]

3. a) Explain in detail different types of sanitary fittings. [8]
   b) Discuss the building drainage system in detail. [8]

4. a) A test bottle containing only seeded dilution water has its DO level drop by 1.0 mg/L in a 5- day incubation. A 300 mL BOD bottle filled with 10 mL of wastewater and the rest seeded dilution water experiences a DO drop of 6.2 mg/L in the same time period. What would be five day BOD of the wastewater? [6]
   b) Explain in detail BOD and COD with equations. [10]

5. a) Explain the cycles of aerobic and anaerobic decomposition. [8]
   b) Explain the working principle of standard rate trickling filter with neat sketch. [8]

6. a) Explain briefly Nitrification and Denitrification. [8]
   b) With the help of the sketch explain UASB process and state advantages and disadvantages of it. [8]

7. a) Discuss the need for sludge treatment and explain the various stages of sludge treatment. [8]
   b) Explain the phenomena of self purification in running streams. Draw the oxygen sag curve and explain its significance. [8]

Code No: **RT41011** **R13** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

ENVIRONMENTAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

*****

PART–A *(22 Marks)*

1. a) What are the considerations while finalizing the type of sewerage system? [4]
   b) List out some of the most common tools required for plumbing. [3]
   c) Explain effect of Oxygen Demanding Wastes on Rivers. [3]
   d) With help of neat diagram explain the functioning of RBC. [4]
   e) Explain the methods for Removing of Phosphates from Wastewater. [4]
   f) Discuss the role of sludge thickening in sludge handling. [4]

PART–B *(3x16 = 48 Marks)*

2. a) What are the various shapes of sewers? Explain the design of egg shaped sewer. [8]
   b) Explain the systems of conveyance of sewage. [8]

3. a) Write about different types of pumps and factors to be considered in selection of pumps for sewerage. [8]
   b) Enumerate one and two pipe system of plumbing along with merits and demerits of each system. [8]

4. Explain briefly the following one. (i) Bar Screens (ii) Grit Chamber (iii) Skimming Tank (iv) Primary Sedimentation Tank [16]

5. a) Explain in detail Oxidation Pond for Municipal Wastewater Treatment. [8]
   b) Explain briefly secondary waste water treatment. [8]

6. a) Design a septic tank for a small colony of 200 persons with daily sewage flow of 120 lpcd. [8]
   b) Explain with neat sketch the working principle of septic tank. [8]

7. a) Explain the different steps in anaerobic digester with the fate of end products. [8]
   b) Enumerate anaerobic sludge digestion process with a neat diagram of digester. [8]

Code No: **RT41011** **R13** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

ENVIRONMENTAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B

*****

PART–A *(22 Marks)*

1. a) Discuss the appurtenances in sewerage. [4]
   b) Write about different types of pumps and factors to be considered in the selection of pumps for sewerage. [3]
   c) What do you understand by sewer and sewerage? [4]
   d) Explain the functioning of Oxidation pond with a diagram. [4]
   e) Discuss the working of UASB and Membrane reactors. [4]
   f) Discuss the method of disposal of sewage on land and soil sickness [3]

PART–B *(3x16 = 48 Marks)*

2. a) Explain in detail the various steps involved in design of sewers. [8]
   b) Design a sewer for a maximum discharge of 650 L/s running half full. Consider Manning's rugosity coefficient n = 0.012, and gradient of sewer S = 0.0001. [8]

3. a) Describe different types of pumping stations and the types of pumps used in each. What is the basis for deciding the capacity of the wet well? [10]
   b) Describe when pumping station will be required in sewerage scheme. [6]

4. a) What is BOD? Explain the significance BOD/COD ratio. [8]
   b) Explain briefly floatation and sedimentation. [8]

5. a) With a neat sketch explain the function of Activated Sludge Process and also mention its modifications and discuss. [8]
   b) Draw process flow diagram of high rate two stage trickling filter and discuss its function. Explain the importance of recirculation. [8]

6. a) Explain the components of Imhoff tanks with neat sketch. [8]
   b) Design a septic tank for 170 users and draw the sketch. Follow BIS 2470 design procedure. [8]

7. a) Explain various stages in self purification of water body along with oxygen sag curve. [8]
   b) Explain the phenomenon that occur - self purification of water bodies with oxygensag curve. [8]