

Code No: R32012

**R10****Set No: 1**

III B.Tech. II Semester Supplementary Examinations, January -2014

**WATER AND WASTEWATER ENGINEERING**

(Civil Engineering)

**Time: 3 Hours****Max Marks: 75**

Answer any FIVE Questions  
All Questions carry equal marks

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1. (a) What are the objectives of a water supply system?  
(b) Explain various population forecasting methods. (6+9)
2. (a) What is an intake structure? Draw a neat Sketch of Canal Intake.  
(b) What is the necessity of pumping? Mention the different types of pumps and their uses. (7+8)
3. Give the layout and general outline of water treatment units and explain. (15)
4. What is disinfection? Explain the various methods of Disinfection. (15)
5. (a) Differentiate between BOD test and COD test. Can a COD test be used as a substitute for BOD test? Justify your answer.  
(b) Calculate BOD of sewage sample of the initial DO, final DO and dilution percentages are 10 mg/l, 2 mg/l and 1% respectively. (8+7)
6. Explain the necessity of providing manhole in sewer line. Explain the construction of a manhole with the help of a neat sketch. (15)
7. Explain preliminary, primary and secondary treatment units in wastewater treatment. (15)
8. Explain a standard rate digester with help of neat sketch. (15)

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1. (a) Differentiate between water quality criteria, water quality objectives and water quality standards.  
(b) Write about water-borne diseases and their control. (9+6)
2. (a) Write the purpose of scour value, air value and check value.  
(b) Explain laying and testing of pipelines. (6+9)
3. (a) Draw the flow diagram of the sequence of water treatment.  
(b) Explain Jar test. (9+6)
4. (a) Explain the theory of Filtrations.  
(b) Write about various disinfection practices. (7+8)
5. (a) What are the sources of sanitary sewage? What factors affect the quantity of sanitary sewage?  
(b) A sewage sample is found to have a BOD<sub>5</sub> of 250 mg/l. If the rate constant is 0.15/d estimate ultimate carbonaceous BOD of sewage (8+7)
6. Draw the neat sketch of DO sag curve and describe the salient features. (15)
7. (a) Explain Activated sludge process.  
(b) What is f/m ratio? (12+3)
8. Compare and contrast standard rate digester and high rate digester. (15)

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**R10****Set No: 3**

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(Civil Engineering)

**Time: 3 Hours****Max Marks: 75**

Answer any FIVE Questions  
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1. (a) Explain population forecasting methods.  
(b) Write the role of water as a vehicle of disease transmission. (10+5)
2. (a) Distinguish between surface water quality and groundwater quality.  
(b) Explain Hardy-Cross method. (8+7)
3. (a) Explain the principles involved in sedimentation and Coagulation.  
(b) How is optimum dosage of coagulant determined in laboratory? (8+7)
4. (a) Explain the mechanisms involved in filtration.  
(b) Explain the theory of chlorination. (8+7)
5. (a) Compare and contrast conservancy system and water carriage systems.  
(b) If 3ml of raw sewage has been diluted to 300 ml and the DO Concentration of the diluted sample at the beginning of BOD test was 8 mg/l and after 5 days incubation at 20°C the DO is 4 mg/l. Find the BOD of raw sewage. (6+9)
6. Why is it necessary to provide sewer appurtenances in the sewer lines? With the help of neat sketch explain the working of drop manhole. (15)
7. With neat sketch explain the principle involved and working of trickling filter. (15)
8. Explain biological stabilization and factors controlling digestion. (15)

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**R10****Set No: 4**

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(Civil Engineering)

**Time: 3 Hours****Max Marks: 75**

Answer any FIVE Questions  
All Questions carry equal marks

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1. (a) With help of a neat sketch, write about the sanitary protection of wells.  
(b) What is the design period of water supply projects? What are the governing factors before designing a purpose water works project? (7+8)
2. (a) Explain with neat sketch the different layout of distribution systems.  
(b) With neat sketch explain an infiltration gallery. (10+5)
3. Draw the flow diagram of sequence of units in a water treatment plant and explain. (15)
4. (a) Explain with C/S details and the working of a Rapid Sand Filter.  
(b) What is residual chlorine? What is its purpose. (8+7)
5. (a) Derive an expression for first stage BOD exertion. Why are COD values always higher than BOD values?  
(b) What is the ratio of 5 days 35°C BOD to the 5 day 20°C BOD? (8+7)
6. What are the Zones of self-purification of streams? Explain. (15)
7. Compare and Contrast Activated sludge process and trickling filter. (15)
8. Explain Sludge Treatment. (15)

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