

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:3160611****Date:26/11/2021****Subject Name:Environmental Engineering****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**MARKS**

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|------------|-----|--|-----------|
| <b>Q.1</b> | (a) | Explain the physical characteristics of water  | <b>03</b> |
|            | (b) | Define BOD. Give the significance of BOD test for wastewater.  | <b>04</b> |
|            | (c) | Draw a neat flow chart of a conventional water treatment plant. Enlist the function of each unit.  | <b>07</b> |
| <b>Q.2</b> | (a) | What is design period? Explain the factors affecting the selection of the design period.   | <b>03</b> |
|            | (b) | Find BOD <sub>(5,20)</sub> of a wastewater sample, if BOD <sub>(3,27)</sub> of the sample is 220 mg/lit. Take $k_D$ value at 20°C as 0.1 day <sup>-1</sup>   | <b>04</b> |
|            | (c) | Explain the factors affecting the self purification capacity of the river.   | <b>07</b> |
|            |     | <b>OR</b>  |           |
|            | (c) | Explain the zones of pollution of a polluted stream  | <b>07</b> |
| <b>Q.3</b> | (a) | Differentiate between plain sedimentation and sedimentation aided with coagulation   | <b>03</b> |
|            | (b) | Differentiate between suspended growth and attached growth process.  | <b>04</b> |
|            | (c) | Design a primary sedimentation for treating 8 MLD of water   | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.3</b> | (a) | Why back washing is required in a rapid sand filter? What is the commonly used rate of back washing?   | <b>03</b> |
|            | (b) | Explain with neat sketch, working of a flash mixer.  | <b>04</b> |
|            | (c) | Explain different types of traps used in house drainage system.  | <b>07</b> |
| <b>Q.4</b> | (a) | Explain how you will find the dry weather flow required for design of sewerage system.   | <b>03</b> |
|            | (b) | Differentiate between activated sludge unit and trickling filter.  | <b>04</b> |
|            | (c) | Calculate the diameter and discharge of a circular sewer laid at a slope of 1 in 450 when it is running half full, and with a velocity of 1.0 m/s. Take Manning constant as 0.013.   | <b>07</b> |
|            |     | <b>OR</b>  |           |
| <b>Q.4</b> | (a) | Draw a house drainage plan for a 3BHK detached bungalow.   | <b>03</b> |
|            | (b) | Enlist different equipments that can be used to control suspended particulate matter. Explain working of any one of them in detail.  | <b>04</b> |
|            | (c) | A single stage trickling filter is required to be designed to treat 3 MLD of sewage with BOD of 250 mg/L. Assume organic loading rate as 11000 kg/ha-m/day and recirculation ratio as 1.0. What will be the BOD of the effluent? | <b>07</b> |
| <b>Q.5</b> | (a) | Enlist sources of noise pollution.   | <b>03</b> |
|            | (b) | Define EIA. Draw a flow chart showing different steps involved in the EIA process.   | <b>04</b> |
|            | (c) | Explain sanitary land filling used for solid waste disposal.   | <b>07</b> |

**OR**

- Q.5** (a) Find the head loss due to friction in a rising main using following data: **03**
1. Length of rising main= 750m
  2. Diameter of the pipe= 0.25m
  3. discharge= 1.5 m<sup>3</sup>/min
  4. Coefficient of friction= 0.0075.
- (b) Why EIA is required for achieving the goal of sustainable development. **04**
- (c) Explain the effect of air pollution on human beings **07**

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3160611****Date:03/06/2022****Subject Name:Environmental Engineering****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**MARKS**

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|------------|-----|---|-----------|
| <b>Q.1</b> | (a) | What is the necessity of water supply scheme? Draw a complete flow diagram of water treatment plant.  | <b>03</b> |
|            | (b) | Discuss various control measures for water borne diseases.  | <b>04</b> |
|            | (c) | Enlist different physical and chemical characteristics of water and discuss their environmental significance.   | <b>07</b> |
| <b>Q.2</b> | (a) | Explain population forecasting by geometrical increase method.  | <b>03</b> |
|            | (b) | Find average of pH 2 and pH 6. Calculate how much acidic is pH 2 compared to pH 6.  | <b>04</b> |
|            | (c) | What is solid waste management? State the composition and characteristics of the municipal solid waste.   | <b>07</b> |
|            |     | <b>OR</b>   |           |
|            | (c) | What is an intake structure? Sketch and explain construction and working of a river intake.   | <b>07</b> |
| <b>Q.3</b> | (a) | What causes alkalinity in water.  | <b>03</b> |
|            | (b) | Give advantages and disadvantages of RCC pipe.  | <b>04</b> |
|            | (c) | Give comparison between rapid sand filter and slow sand filter.   | <b>07</b> |
|            |     | <b>OR</b>   |           |
| <b>Q.3</b> | (a) | Explain reflux valve with neat sketch.  | <b>03</b> |
|            | (b) | Write short note on Grid iron system of water distribution network.   | <b>04</b> |
|            | (c) | Design a sedimentation tank for a water works, which supplies $1.4 \times 10^6$ liter/day water to the town. The sedimentation period is 5 hours, the velocity of flow is 12 cm/minute, depth of water in the tank is 4.0m. Assuming an allowance for sludge is to be made as 80cm. | <b>07</b> |
| <b>Q.4</b> | (a) | Differentiate between aerobic and anaerobic decomposition of wastewater.  | <b>03</b> |
|            | (b) | What do you understand by sedimentation with coagulation?   | <b>04</b> |
|            | (c) | What are various methods of disinfection? What are the chemicals used as disinfectants?   | <b>07</b> |
|            |     | <b>OR</b>   |           |
| <b>Q.4</b> | (a) | What is dB? Explain the effects of noise pollution.   | <b>03</b> |
|            | (b) | Discuss the different methods of sewage disposal.   | <b>04</b> |
|            | (c) | Determine $BOD_8$ at $15^\circ C$ if $BOD_5$ at $20^\circ C$ is 150 mg/l. $k_{D(20)} = 0.23$ .  | <b>07</b> |

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|------------|------------|--|-----------|
| <b>Q.5</b> | <b>(a)</b> | Differentiate between BOD and COD.                               | <b>03</b> |
|            | <b>(b)</b> | Write a short note on septic tank.                               | <b>04</b> |
|            | <b>(c)</b> | Explain DO sag curve with sketch.                                | <b>07</b> |
|            |            | <b>OR</b>  |           |
| <b>Q.5</b> | <b>(a)</b> | Explain effects of air pollution on human health.                | <b>03</b> |
|            | <b>(b)</b> | Write a short note on composting.                                | <b>04</b> |
|            | <b>(c)</b> | Sketch and explain construction and working of trickling filter. | <b>07</b> |

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