**20CE504/PE**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **January, 2024** | **Civil Engineering** | | |
| **Fifth Semester** | **Advanced Environmental Engineering** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

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|  |  |  | CO | BL | M |
| 1 | a) | Define self-purification constant. | CO1 | L4 | 1M |
|  | b) | Draw oxygen sag curve and note different parameters on it. | CO1 | L4 | 1M |
|  | c) | What is sewage sickness? | CO1 | L4 | 1M |
|  | d) | List the characteristics of sludge. | CO1 | L4 | 1M |
|  | e) | Define Sludge Volume Index. | CO1 | L4 | 1M |
|  | f) | What are the products of digestion? | CO1 | L4 | 1M |
|  | g) | What is symbiosis process in oxidation pond? | C02 | L4 | 1M |
|  | h) | What do you mean by Extended aeration process? | C02 | L4 | 1M |
|  | i) | What is denitrification? | C02 | L4 | 1M |
|  | j) | List the basic types of toilets. | CO3 | L4 | 1M |
|  | k) | What is neutralization? | CO3 | L4 | 1M |
|  | l) | List out the chemicals used in Kraft process while making the pulp. | CO3 | L4 | 1M |
|  | m) | Write any four characteristics of sugar industry wastewater. | CO3 | L4 | 1M |
|  | n) | What is White water? | CO3 | L4 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Explain the self-purification process in streams. | CO1 | L4 | 7M |
|  | b) | A town discharges 120 cumecs of sewage into a river having a rate of flow of 1600 cumecs during lean period with a velocity of 0.1 m/s. The 5-day BOD of sewage at the given temperature is 250 mg/l. Determine the amount of critical DO deficit, and when and where it will occurs in the downstream portion of the river. Assume de-oxygenation coefficient k1 as 0.23/d (base ‘e’) and coefficient of self-purification as 3.5. Saturation DO at given temperature is 9.2 mg/l. | CO1 | L2 | 7M |
| **(OR)** | | | | | |
| 3 | a) | Describe the factors affecting the sludge digestion. | CO1 | L3 | 7M |
|  | b) | What are the methods for disposal of sludge? Discuss about sludge drying bed method with sketch. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Design an oxidation pond to treat the flow of 2 MLD. The BOD of sewage is 200 mg/l and the hydraulic loading as 300 kg per day per hectare. | CO2 | L2 | 7M |
|  | b) | Write short note on i) Aerated lagoons ii) Oxidation ditches | CO2 | L4 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Explain the removal of nitrogen by biological nitrification and denitrification process? | CO2 | L3 | 7M |
|  | b) | Discus about the construction and working of RBC with a sketch. | CO2 | L3 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | Discuss the immediate and short term long term sanitation in emergencies. | CO3 | L3 | 7M |
|  | b) | Write about the low cost toilets. | CO3 | L4 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Explain the challenges of transportation of wastewater in sanitary system. | CO3 | L4 | 7M |
|  | b) | Discuss about noise reduction in water conveyance systems. | CO3 | L4 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Explain the characteristics of industrial wastewater? | CO3 | L4 | 7M |
|  | b) | Discuss the different methods of treating industrial wastewater. | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Discuss about various treatment methods used in sugar industry with flow diagram. | CO3 | L4 | 7M |
|  | b) | What are the characteristics of wastewater from Pulp and paper industry? | CO3 | L4 | 7M |