

Industrial Waste water treatment

1/6/19
Page (1)

m. ETO En engg. IIM II Rev Industrial waste water treatment

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Mason

- N.B.: (1) Question No. 1 is compulsory.
 (2) Attempt any four questions out of remaining six questions.
1. (a) An electroplating industry has an effluent with the following characteristics.

- (i) Cyanide : 50 m³/d
- (ii) Chromium : 60 m³/day
- (iii) Acid : 100 m³/d

composition :

- Cr⁶⁺ - 40 mg/L, Zn⁺⁺ - 60 mg/L
- CN⁻ - 30 mg/L, Acidity - 5000 mg/L

Design suitable treatment plant and explain the Principles of design of the units. Draw flow sheet of the treatment.

2. (a) A distillery factory produces 500 m³/d of waste water. Design a suitable treatment plant for rendering the treated effluent fit for discharge into a perennial river. 10
- (b) Describe the techniques of reducing the strength of the industrial wastewaters. 10
3. (a) Discuss the details about stream standards and effluent standards by giving merits and demerits of each. Also give effluent standards for treated industrial wastes that are to be discharged- 14
- (i) into stream
 - (ii) into sewers
 - (iii) on land for irrigation.
- (b) List of methods used in cyanide removed and explain one in detail. 6
4. (a) Explain the self purifying capacity of river. 6
- (b) A city discharges 3,00,000 m³/d of sewage into a stream with minimum flow of 25 m³/s. The stream velocity down below the mixing point is 3 km/hr. Temperature of both sewage and stream water are 20°C. BOD₅ of sewage at 20°C is 175 mg/L, while that of stream is 90% saturated with D.O. k₁ and k₂ at 20°C are 0.1/d and 0.2/d respectively. Determine the critical oxygen deficit and its location. Also estimate BOD₅ of a sample taken at critical point. Assume D.O. saturation at 20°C = 9.2 mg/L. Find out the D.O. at a distance at 100 km from point of discharge. 14
5. (a) Design E.T.P. for treatment of car manufacturing unit effluent, for the following properties- 14
- Flow : 150 m³/d
 - pH : 11-12
 - BOD₅ @ 27°C : 50-70 mg/L
 - Total solids : 5000-6000 mg/L
 - T.D.S. : 1500-2000 mg/L
 - C.O.D. : 500-700 mg/L
 - Fe : 600-700 mg/L
- The treated effluent should meet river water disposal standards.
- (b) Suggest a suitable treatment method for the point industry. Assume suitable data. 6
6. (a) Explain with the help of a schematic flowsheet, the various manufacturing processes involved in a composite cotton textile mill. 14
- Indicate the points of origin and waste and write the characteristics of wastes.
- (b) Explain the concept of reuse, recycling, recovery with reference to industrial waste treatment. 6
7. Write short notes on any four :- 20
- (a) Treatability study
 - (b) Treatment of petrochemical waste
 - (c) Kier waste treatment
 - (d) Potash recovery in industry
 - (e) Treatment of radioactive waste.