

320733(20)

B. E. (Seventh Semester) Examination, April-May 2021

(New Scheme)

(Civil Engg. Branch)

ENVIRONMENTAL ENGINEERING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) (2 marks) is compulsory. Choose any two parts from (b), (c) and (d) (7 marks each). Assume suitable values of design data wherever applicable and mention the same.

Unit-I

1. (a) Define Self cleansing velocity and the necessity of development of self cleansing velocity in the sewer pipes.

[2]

- (b) Draw and describe the following : 7
- (i) Lamp hole
 - (ii) Drop Man hole
 - (iii) Grease and oil trap
- (c) A 60 cm diameter sewer is to discharge 0.036 cumecs at a velocity as self-cleansing as a sewer flowing full at 0.08 m/sec. Find the depth and velocity of flow and the required slope. Take uniform value of $N = 0.012$. 7
- (d) Derive the hydraulic elements and proportionate flow parameters of a circular sewer flowing at partial depth as to ensure self cleansing velocity. 7

Unit-II

2. (a) Differentiate Unit Processes and Unit Operations. 2
- (b) Design a septic tank cum soak pit for 300 users in a village primary school per capita water supply = 120 lpcd. 7
- (c) Explain the Type-I and II settling adopted for the design of primary settling tank. Describe the settling column test to determine the relevant data for the design of the PST. 7

320733(20)

[3]

- (d) Derive the first stage BOD Equation curve. The BOD of sewage incubated for one day at 32°C has found to be 110 mg/l. What will be the 5-day 20°C BOD. Assume $K = 0.12$ (Base 10) at 20°C . 7

Unit-III

3. (a) Differentiate between recirculation ratio and recirculation factor in trickling filters. 2
- (b) The design flow of sewage is 3.8 million litres per day, and the BOD of raw sewage is 320 mg/l. Design a single stage trickling to produce an effluent from the primary clarifier having a BOD of 42 mg/l. 7
- (c) Differentiate the functioning and designing of Oxidation Pond and Oxidation ditch? Sketch neat figures of both. 7
- (d) Explain in detail (with neat fig.) the various methods of aeration in ASPs. 7

Unit-IV

4. (a) Define SRT and MCRT. 2
- (b) Derive the formula for SVI and prove that SDI is

320733(20)

PTO

- numerically equal to the reciprocal of SVI, expressed in gm/ml. 7
- (c) Define Activated Sludge and explain the different steps in detail of The Activated Sludge Treatment Mechanism. 7
- (d) Prove that the rate of return sludge flow depends on the volume of suspended solids concentration in the secondary clarifier and is a function of mixed liquor volatile suspended solids in the influent. 7

Unit-V

5. (a) Explain the term Garbage. 2
- (b) Explain ther term 'refuse', and give its composition and classification. Describe briefly the various methods employed for collection of the refuse. 7
- (c) Describe briefly method of refuse disposal employed for sanitary land filling. 7
- (d) Explain 4Rs of Solid Waste Management in detail. 7