

320733(20)

B. E. (Seventh Semester) Examination, April-May 2020/

(New Scheme)

NOV-DEC 2020

(Civil Engg. Branch)

ENVIRONMENTAL ENGINEERING-II

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory. Part (a) of each question is compulsory and answer any two parts out of (b), (c) and (d) of each question. Provided neat sketches wherever necessary.

Unit-I

1. (a) Define sewage and sewerage. 2
- (b) Explain different sewerage systems giving their advantage and disadvantages. 7

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- (c) Why are the manholes required and where are these provided? Explain the construction of one with sketch. 7
- (d) A 400 mm dia circular sewer is to flow at depth of 0.3 times diameter on a grade ensuring a degree of self-cleansing equivalent to that obtained at full depth at a velocity of 0.9m/sec. Find the required grade and associated velocity and rate of discharge at this depth. Assume Manning's rugosity coefficient n as 0.013. The variation of n with depth may be neglected. 7

Unit-II

2. (a) What is the significance of nitrites in wastewater characteristics? 2
- (b) Explain the procedure of determination of total solids, suspended, solids, dissolved solids and settleable solids for a wastewater sample. How one can determine the volatile and fixed part of these solids? 7
- (c) Explain the construction, working and design criteria of Septic Tank giving neat sketch. 7
- (d) A 4% solution of a sewage sample is incubated for 5 days at 20°C. The depletion of oxygen was found to be 4 mg/L. Determine the BOD of the sewage. What will be 3-day BOD of this sewage in summer

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when the temperature is 37°C? Take the BOD rate constant (base 10) as 0.1 per day at 20°C. 7

Unit-III

3. (a) What do you mean by secondary treatment of waste water? 2
- (a) What do you understand by suspended growth process and attached growth process? Explain the working of a Trickling Filter giving neat sketch. 7
- (b) A single stage trickling filter is designed for an organic loading of 10000 kg of BOD in raw sewage per hectare meter per day with a re-circulation ratio of 1.5. This filter treats a flow of 4 MLD of raw sewage with a BOD of 2000 mg/L. Using NRC formula determine the strength of the effluent. 7
- (d) Write notes on the following : 7
- (i) Oxidation ditch
- (ii) Activated Sludge Process

Unit-IV

4. (a) What is Oxygen sag curve? 2
- (b) Explain the different stages in anaerobic digestion of sludge. 7
- (c) The rate of flow in river is 3 cum/sec and has a

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BOD₅ of 2 mg/L. The river is saturated with D.O. of 9.2 mg/l at 20°C. Wastewater having BOD₅ of 120 mg/L and D.O. content zero with a flow rate of 0.30 cum/sec is discharged into river. Assuming temperature of 20°C throughout and deoxygenation coefficient as 0.1/days and reoxygenation coefficient of 0.3/day. Find out the degree of treatment required if the minimum DO to be maintained in the river is 4 mg/L. 7

(d) Describe the characteristics of wastewater generated from a sugar industry and also mention the treatment methodology to be adopted for such waste. 7

Unit-V

5. (a) Compare the per capita solid waste generated in India and some developed countries. 2
- (b) Describe different method for collection and disposal of municipal solid waste. 7
- (c) Explain the various adverse effects on health, due to ill managed municipal solid waste of city. 7
- (d) Write notes on following : 7
- (i) Incineration
 - (ii) Composition of refuse
 - (iii) Composting