

[01 - 4108]

IV/IV B.E. DEGREE EXAMINATION.

First Semester

Civil Engineering

ENVIRONMENTAL ENGINEERING — II

(Common for Civil and Civil Environmental  
Engineering)

(Effective from the admitted batch of 2006–2007)

Time : Three hours

Maximum : 70 marks

Answer any FIVE questions and

Question No. 1 is compulsory.

1. (a) Differentiate between domestic sewage, industrial sewage and sanitary sewage.
- (b) Define critical rainfall intensity.
- (c) Under what circumstances is pumping of sewage necessary?
- (d) Explain population Equivalent.
- (e) Compare septic tank with Imhoff tank in function.

(f) Define SVI.

(g) What is f/m ratio?

2. (a) Explain briefly the method of finding out the size of sanitary sewers when the discharge to be carried through them are known.

(b) A population of 30,000 is residing in a town having an area of 60 hectares. If the average coefficient of runoff for this area is 0.60 and the time of concentration of the design rain is 30 minutes. Calculate the discharge for which the sewers of a proposed system will be designed for the town is question. Make necessary assumptions.

3. (a) Draw a neat sketch of a drop man-hole and indicate where it is used.

(b) Describe the laying of a sewer line in a trench.

4. (a) Define BOD. Derive an expression for the first stage BOD. What are the factors on which the de-oxygenation constant depend.

(b) The 7-days  $20^{\circ}\text{C}$  BOD of a sample of sewage is 300 ppm and its 3 - days  $37^{\circ}\text{C}$  BOD is 500 ppm. Find out the value of de-oxygenation constant and then estimate its 5 day  $30^{\circ}\text{C}$  BOD.

5. Design an Imhoff - tank to treat the sewage from a small town with 30,000 population, assuming that the suspended solids in the influent sewage are 200 ppm. Water content of sludge is 97%. Design the tank for three months sludge storage. Rate of sewage is 135 liter per head per day.
6. Determine the size of a high rate trickling filter for the following data :
- Sewage flow 4.5 m<sup>3</sup>/d  
Recirculation Ratio 1.5  
BOD of raw sewage 250 mg/l  
BOD of removal in primary tank = 30%  
Final effluent BOD desired = 30 mg/l.
7. (a) What is meant by activated sludge? State the properties of activated sludge and explain its action.  
(b) State the objectives of sludge digestion. Explain the various methods of sludge treatment.
8. Write short notes on any THREE :
- (a) Oxidation ditch  
(b) Grut chambers.  
(c) Sludge drying beds  
(d) Drop man hole  
(e) Self - cleansing velocity.

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[2542/II/12]