

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00844 June, 2017

BICE-018 : ENVIRONMENTAL ENGINEERING – II

Time : 3 hours

Maximum Marks : 70

*Note : Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is allowed. Assume missing data, if any.*

1. Describe combined and separate sewer systems, in detail. 14
2. Describe, with the help of neat sketches, the process of anaerobic digestion of sludge. 14
3. Describe the wastewater treatment processes used for nutrient removal from wastewater. 14
4. Design a sewer for a population of 36,000. Assume a per capita water demand of 135 l/d, of which 80% finds its way to the sewers. The slope of the sewer is 1 in 625 and the sewer should be designed to carry 4 times the dry water flow when running full. What would be the velocity of flow in the sewer when running full ? Assume Manning's coefficient $n = 0.012$. 14

5. Describe the laying and testing of sewers, in detail. 14
6. A city discharges 100 cumecs of sewage into a river, which is fully saturated with oxygen (9.2 mg/l) and flowing at the rate of 1500 cumecs during its lean days with a velocity of 0.1 m/s. The 5-day BOD of sewage at the given temperature is 280 ppm. Find when and where the critical DO deficit will occur in the downstream portion of the river, and what is its amount. Assume coefficient of purification of the stream as 4 and the coefficient of deoxygenation ($= k_D$) as 0.1/day. 14
7. Write short notes on any **four** of the following : $4 \times 3 \frac{1}{2} = 14$
- (a) Oxidation Ditch
 - (b) Sewer Appurtenances
 - (c) Sludge Thickening
 - (d) Common Effluent Treatment Plant
 - (e) Aerated Lagoons
-