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**Question Paper Code: 36103**

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Sixth Semester

Civil Engineering

01UCE603 - WASTE WATER ENGINEERING

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define population equivalent.
2. Write the rational formula for storm runoff estimation.
3. What are the objectives of sewage treatment process?
4. What is meant by Grey Water harvesting?
5. What is Activated sludge process?
6. What is the use of oxidation ditch in secondary treatment?
7. What is UASB?
8. Write the factors affecting the rate of Re-oxygenation in streams.
9. Give different types of thicker unit.
10. What is meant by ripened sludge?

PART - B (5 x 16 = 80 Marks)

11. (a) Discuss the factors involved in the estimation of quantity of sewage. (16)

Or

- (i) Explain the methods of two pipe and one pipe plumbing system. (8)
- (ii) With neat sketch explain the component parts of the deep manhole. (8)
12. (a) Design the dimensions of a septic tank for small colony of 150 persons provided with an assured water supply from the municipal head works at a rate of 120 lit/c/day. Assume any data, you may need. (16)

Or

- (b) Discuss about the construction, operation and maintenance of primary treatment units. (16)
13. (a) The sewage is flowing @ 4.5 million liters per day from a primary clarifier to a standard rate trick long filter. The 5-day BOD of the influent is 160 mg/l. The value of the adopted organic loading is to be 160 gm / m<sup>3</sup>/ day and surface loading 2000 lit/m<sup>2</sup>/day. Determine the volume of the filter and its depth. Also calculate the efficiency of this filter unit. (16)

Or

- (b) (i) With neat sketch, discuss the working principle of trickling filter. (8)
- (ii) Discuss the various methods of waste water reclamation techniques. (8)
14. (a) Enumerate the two general methods adopted for sewage disposal and explaining the conditions favourable for their adoption. (16)

Or

- (b) Explain self purification of surface water bodies. (16)
15. (a) Describe the various methods of disposal of dewatered sludge, highlighting their suitability, merits and demerits. (16)

Or

- (b) What is sludge digestion? Describe about anaerobic digestion process in recovery of biogas. (16)
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