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53 (CE 602) ENEN

2016

**ENVIRONMENTAL ENGINEERING-II**

Paper : CE 602

Full Marks : 100

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

Answer **any five** questions.

1. (a) Differentiate between Sewage and Drainage. Discuss the rational formula for calculating the peak drainage discharge for a given catchment. 10
- (b) Describe in order the various stages followed in the construction of sewers. 10

Contd.

2. (a) A main combined sewer was designed to serve an area of 60sq. km with an average population of 185 persons/hectare. The average rate of sewage flow is 350litres/capita/day. The maximum flow is 50% in excess of the average together with the rainfall equivalent of 12mm is 24 hrs, all of which are run-off. What should be the capacity of the sewer in cu.m/sec?

14

- (b) The 5-day 30°C BOD of sewage sample is 110mg/l. Calculate its 5 days 20°C BOD. Assume the deoxygenation constant at 20°C  $K_{20}$  as 0.1.

6

3. (a) Calculate the velocity and discharge through a rectangular concrete lined smooth channel 2.4m wide and 1.2m deep built to a slope of 1 in 200, when running completely full use Bazin's coefficient in Chezy's formula as

$$C = \frac{157.6}{1.81 + \frac{K}{\sqrt{R}}} \quad 2$$

- (b) What is BOD ? Deduce an expression for BOD with time. State the factors on which the deoxygenation constant ( $K$ ) depends. 10
- (c) Sketch and describe the construction and working of a septic tank. 8
4. (a) Compare the conservancy and the water carriage system. 6
- (b) Draw the diagram of an activated sludge process for the treatment of sewage. Discuss the role of returned sludge. Compare a conventional activated sludge with extended aeration plant. 14
5. (a) Discuss the mechanism of working of a stabilization pond. 8
- (b) Compute the diameter of a circular trickling filter for 250 users, dry weather flow is 120 litres per capita per day. Rate of filtration of trickling filter may be taken as 10 million litres per hectare/m. 12

6. Write short notes on :

4×5=20

(i) Oxygen sag curve

(ii) Flushing tank

(iii) Sewage sickness

(iv) Rotating Biological Contactors (RBC)

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