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## EIS-204

B.E. (VIIth Sem.) (CGPA) Civil Engg. Exam.-2016

### ENVIRONMENTAL ENGINEERING-III

Paper - CE-701

*Time Allowed : Three Hours*

*Maximum Marks : 60*

**Note :** Solve all questions.

All carry equal marks.

Make assumptions and draw neat sketches wherever necessary.

- Q.I (a) In how many forms Nitrogen may present in water? What is Kjeldahl nitrogen? Write significance and ill effects of excess presence of nitrogen. 4
- (b) During a recuperation test, the water in an open well was depressed, by pumping, by 2.5 metres and it recuperated 1.8 metres in 80 minutes. 8  
Find —  
(i) yield from a well of 4m diameter under a depression head of 3 metres,  
(ii) the diameter of the well to yield 8 litres/ second under a depression head of 2 metres.

(2)

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or

(a) Write a short note on provision of 'fire demand' in water supply. Write different ways or formulae through which it can be calculated. 4

(b) Given the following data, calculate the population at the end of next three decades by decreasing rate method— 8

(i)	1981	80,000
(ii)	1991	1,20,000
(iii)	2001	1,68,000
(iv)	2011	2,28,580

Q.II (a) Explain the working of — 4

- (i) Pressure relief valve
- (ii) Reflux valve

(b) Estimate the hydraulic gradient in a 2 m diameter smooth concrete pipe carrying a discharge of 3 cumecs at 10°C temperature by using— 8

- (i) Manning's formula
- (ii) By Hazen-William's formula and by
- (iii) Modified Hazen-Williams's formula.

Take Manning's rugosity coefficient, Coefficient of hydraulic capacity and dimensionless coefficient of roughness as 0.013, 130 and 1.0 respectively.

or

- (a) Explain the significance of the following from the point of view of water quality criteria— 6
- (i) Hardness
  - (ii) Chlorides
  - (iii) Coliform index
- (b) In a water treatment plant ,the pH values of incoming and outgoing water are 7.2 and 8.4 respectively. Assuming a linear variations of pH with time, determine the average pH value of water. 6

Q.III (a) Compare lime soda and Zeolite process of water softening. 6

(b) 8 mg of copperas is consumed with lime at a coagulation basin, per litres of water. Determine the quantity of copperas and the quick lime required to treat 10 million litres of water. 6

or

- (a) Explain break point chlorination process with suitable sketch. 6
- (b) A filter unit is 4.5 m by 9.0 m. After filtering 10000 cum /day in 24 hrs period ,the filter is back washed at a rate of 10 lit/m<sup>2</sup>/sec for 15 min. Compute the average filtration rate, quantity, and percentage of treated water used in washing and the rate of wash water flow in each trough. Assume 4 trough. 6

(4)

Q.IV (a) Find the equivalent length of 30 cm diameter pipe for the following data— 6

- (a)  $L_1=300 \text{ m } D_1 = 40 \text{ cm}$
- (b)  $L_2=400 \text{ m } D_2 = 30 \text{ cm}$
- (c)  $L_3=500 \text{ m } D_3=20 \text{ cm}$ , use —
  - (i) Darcy's formula
  - (ii) Hazen Williams formula

(b) Describe the functions of distribution reservoir. 6  
or

- (a) Write short notes on the detection of leakage in the distribution pipes. 6
- (b) A service reservoir receives water from an impounding reservoir 40 m away. The difference in levels of these reservoir is 120 m. The two reservoir were originally connected by a single pipe line designed for max discharge of 18 million lit/day. Discharge is to be increased to 25 million lit/day by laying another pipe line of same dia alongside of first. Determine dia of pipes. 6

Q.V (a) Describe a simple method of treating high fluorine water to treat rural water supply. 6  
(b) Describe simple technique for removal of iron from rural water supply. 6

or

- (a) Write general requirements of domestic water storage tanks. 6
  - (b) Explain the various components of a house water connection with suitable sketch. 6
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