

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)**

CLASS: BE
BRANCH: CIVIL

SEMESTER: VI
SESSION : SP/2020

SUBJECT : CE6001 ENVIRONMENTAL ENGINEERING

TIME: 1.5 HOURS

FULL MARKS: 25

INSTRUCTIONS:

1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

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- Q1 (a) Draw the flow diagram of a typical water supply scheme using a river as a water source? [2]
(b) Compute the fire demand for a city having population of 1,60,000 using various formulae? [3]
- Q2 In two periods each of 20 years, a city has grown from 40,000 to 1,60,000 and then 2,80,000. Determine, (a) the saturation population (b) the equation of the logistic curve, (c) the expected population after the next 15 years? [5]
- Q3 (a) Discuss head loss in a pipe due to friction with the help of Hazen William's formula? [2]
(b) What is an intake structure? Enumerate the various types of intakes, and discuss any one in detail with a neat sketch? [3]
- Q4 The following information is available regarding the relationship between trap efficiency and capacity inflow ratio. [5]

Capacity in flow ratio	Trap efficiency percent
0.1	87
0.2	93
0.3	95
0.4	95.5
0.5	96
0.6	96.5
0.7	97
0.8	97
0.9	97
1.0	97.5

Find the probable life of the reservoir with an initial reservoir capacity of 30 million cubic metres, if the average annual flood inflow is 60 million cubic metres and the average annual sediment inflow is 2 lakh tonnes. Assume a specific weight of the sediment equal to 1.2 gm per c.c. The usual life of the reservoir will terminate when 80% of its initial capacity is filled up with sediment.

- Q5 (a) Define Displacement efficiency and scour velocity? [2]
(b) Define coagulants? Discuss the different chemicals used as coagulant in sedimentation process? [3]
- Q6 (a) In a continuous flow settling tank 3m deep and 60m long, what flow velocity of water would you recommend for effective removal of 0.025mm particles at 25°C. The specific gravity of particles is 2.65, and kinematic viscosity ν for water may be taken as 0.01cm²/sec. [5]