PAPER ID-410410

Subject Code: KCE603

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
ENVIRONMENTAL ENGINEERING

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

Q no.	Question	Marks	CO
a.	What is the variation of water demand?	2	1
b.	Write the main purpose of the construction of water transmission and distribution pipeline.	2	1
c.	What are the requirements of water distribution system?	2	2
d.	Enumerate the methods used for detection of leakage in the underground distribution pipes.	2	2
e.	Write the purpose of microbiological examination of water.	2	3
f.	Write the types of effluent standards.	2	3
g.	What are the functions involved in the chemical unit processes?	2	4
h.	At a water treatment plant, 12 million litres of water are treated daily, using alum dosage of 16 mg per litre. Find total quantity of alum used.	2	4
i.	How Preliminary treatment of Wastewater is carried out?	2	5
j.	What is sewage sludge?	2	5

SECTION B

2. Attempt any *three* of the following:

a.	In the two period of each 20 years, a city has grown from 30,000 to 1,70,000 to 3,00,000. Determine (a) The saturation population (b) The equation of logistic curve (c) The expected population after the 60 years from start.	10	1
b.	Describe the method of estimating capacity of balancing reservoir.	10	2
c.	Determine the total dissolved solids concentration using following data: (i) Volume of filterable sample=50 ml (ii) Tare weight of the evaporating dish ==30.3419 gm (iii) Weight of evaporating dish with dry soils= 30.3675 gm	10	3
d.	Enlist the applications of various chemical unit processes employed in waste water treatment.	10	4
e.	The sewage flows from a primary settling tank to a standard rate trickling filter at a rate of 5 million litres per day having a 5-day BOD of 150 mg/l. Determine the depth and the volume of the filter, adopting a surface loading of 2500 l/m^2/day and an organic loading of 165 g/m^3. Also determine the efficiency of filter unit using NCR formula.	10	5

SECTION C

3. Attempt any *one* part of the following:

a.	Explain with neat sketch (i) Pressure distribution in gravity transmission mains (ii) Pressure distribution in pumped transmission mains.	10	1
b.	Write the necessity of water supply appurtenances. Also write the functions of valves. What is zero velocity valves?	10	1

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4. Attempt any *one* part of the following:

a.	Explain with neat sketch as to how municipal water is connected to private building and houses for giving water supply connection.	10	2
b.	A town with a population of 1 million has continuous water supply. Average supply is 270 lpcd, the water being supplied by direct pumping. The total supply lpcd is given in table. Water is supplied from treatment plant at a uniform rate of 11.25 million litres per hours, for all 24 hours. Find the capacity of the reservoir required for distribution of works.	10	2

Time	lpcd
5 A.M. to 11 P.M.	90
11 A.M. to 3 P.M.	54
3 P.M. to 9 P.M.	81
9 P.M. to 1A.M.	27
1 A.M. to 5 A.M.	18

5. Attempt any *one* part of the following:

a.	All the three samples have the same 5-day BOD of 200 mg/L but their k values are 0.10, 0.15 and 0.25 day^{-1}. Determine the ultimate BOD of each sample also show these results on graph.	10	3
b.	Explain environmental significance of chemical oxygen demand.	10	3

6. Attempt any *one* part of the following:

a.	Design a coagulation -cum-sedimentation tank with continuous flow for a population of 60, 000 persons with a daily per capita water allowance of 120 litres. Assume suitable data where needed. Also draw the sketch.	10	4
b.	Discuss the use of chlorine as disinfecting agent with reference to its disinfecting action and its doses.	10	4

7. Attempt any *one* part of the following:

a.	Design Imhoff tank for a town having population 17000 persons. The rate of sewage 150 l/day. Assume suitable data where required.	10	5
b.	Discuss in brief the rotating biological contactors with neat sketch. Also write advantages and disadvantages RBCU.	10	5