

BACHELOR OF ENGINEERING (Civil Engineerig) EXAMINATION, 2019
THIRD YEAR, SECOND Semester Examination

SUBJECT: WATER SUPPLY ENGINEERING

Full Marks 30/100

Time: ~~Two hours~~/Three hours/~~Four hours~~/ Six hours

Use a separate Answer-Script for each part

No. of Questions	Part I (Marks:50)	Marks
	<p>Answer Any Three(3) questions. Two marks are reserved for neatness and to the point answer Assume relevant data if not given</p>	
Q1.		
(a)	<p>What are the major pollutants in water supply sources? Describe with necessary flow sheet different types of unit operation with justification for making water fit for potable purposes considering river is the source.</p>	3+7
(b)	<p>Derive an expression for determine settling velocity of a particle in quiescent water.</p>	6
Q2		
(a)	<p>Distinguish between discrete and flocculent settling. Under what condition chemical sedimentation is accomplished ?</p>	2+2
(b)	<p>In a water treatment plant water having viscosity 1.01 centistokes carries solid particle with an average diameter of 0.05mm. and specific gravity 1.2. Calculate settling velocity of settling particles .</p>	4
(c)	<p>Discuss the theory of an Ideal Settling Basin. What is its significance? Prove that overflow rate and settling velocity is identical in units .</p>	5
(d)	<p>What is the purpose of adding coagulants? Why lime is added at times with alum for chemical sedimentation?</p>	3
Q3.		
(a)	<p>Laboratory tests show that 99.9% kill could be obtained in 10 min with a concentration of 14mg/l. What should be the contact time to obtain 99.99% kill with the same dose of the disinfectant? Derive necessary expression for solving the problem.</p>	6
(b)	<p>Describe the Jar test experiment for determining optimum coagulant dose.</p>	4
(c)	<p>Alum , Al₂(SO₄)₃, 18 H₂O is to be used for coagulation purpose in a water treatment plant with a capacity of 1000000L per hour. The raw water has a natural alkalinity Of 14mg/l,as CaCO₃, how much Ca (OH)₂ shall be required daily for optimum coagulation? The alum dose is 60mg/l.</p>	6

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No. of Questions	Part I (Marks:50)	Marks
Q4.		
(a)	Discuss the necessity and mechanism of granular bed filtrations.	4
(b)	With the help of a neat sketch explain the operation principle of rapid gravity sand filter. Show different valves for operation of the filter	7
(c)	Explain the action of chlorine for disinfection of water. What do you mean by Breakpoint Chlorination ?	5

Bachelor of Civil Engineering(Part Time) Third Year Second Semester Examination 2019**Sub: Water Supply Engg.**

Time: Three Hours

Full Marks: 100

Use separate answer script for each part
(50 marks for each part)

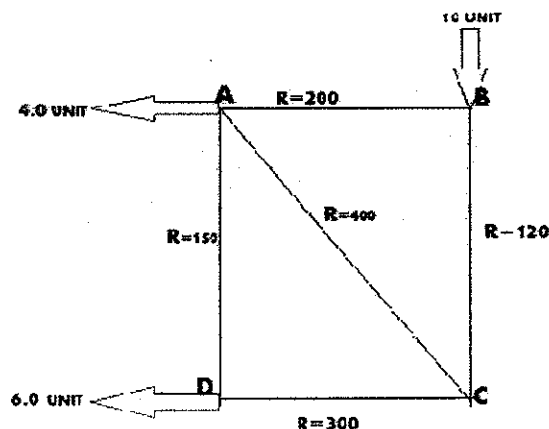
Part II**Group A : Answer any two question****2x15**

1. The following data has been noted from the census department of a town.

Year	Population
1971	60,000
1981	70,000
1991	1,10,000
2001	1,40,000
2011	1,76,000

Determine the future population of the town for the year 2031; estimate by both Geometrical increase method and Incremental increase method.

2. Water has to be supplied to a town with 80, 0000 population at the rate of 135 litres per capita per day from a river 2.6 km away. The difference in elevation between the lowest water level in the sump and service reservoir staging is 38 meters. Pumps are working for 12 hours per day. The design should accommodate maximum daily demand. Assume the flow velocity between 1.5m/sec to 2.0m/sec and also assume C_H of the pipe is 120, efficiency of the pump set is 0.65. Determine the size of the supply main pipe diameter and horse power of the pump required.
3. A pipe network with two loops is shown in Fig. Determine the flow in each pipe for an inflow of 10 units at the junction B and outflows of 4.0 units and 6.0 units at junctions A and D respectively. The resistances R for different pipes are shown in the figure



4. For a city of a population 4,00,000, find the following for the city.
 - i) Total Domestic demand.
 - ii) Fire demand.
 - iii) Maximum hourly demand for the maximum day.

5. What are the factors affecting Losses and Wastes of municipal water?

6. What are the factors governing the location of an intake?

7. State Chick's Law.
An experiment shows that 99.9% kill of organism in a sample of water at Chlorine concentration of 5 mg /lit with a contact period of 22 minutes. Find out the contact time required for 99.99% kill.

8. What are the causes of hardness of water? Discuss the methods of removing temporary and permanent hardness.

9. Discuss the Bacteriological quality guideline for water in distribution system.