

BACHELOR OF CIVIL ENGINEERING EXAMINATION, 2018
III RD YEAR, SECOND SEMESTER EXAMINATION (SUPPLEMENTARY)OLD

SUBJECT: WATER SUPPLY ENGINEERING

Full Marks 30/100

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

Use one Answer-Script for entire part

No. of Questions		Marks																		
	<p>Answer Any five(5) questions</p> <p>Assume relevant data if not given</p>																			
Q1.	<p>Write short notes:- (any four)</p> <p>i) Fire water demand ii) Coincident demand iii) Equivalent pipe iv) Balancing reservoir v) Hardness vi) Ring distribution system vii) Slow sand filter viii) Chlorine demand</p>	<p>4x5 =20</p>																		
Q2	<p>What do you understand by per capita water demand? Explain the factors which influence the annual average water demand.</p>	4																		
(a)																				
(b)	<p>A water supply scheme has to be designed for a city having a population of 2 lakh. Calculate the maximum daily demand and coincident demand.</p>	4																		
(c)	<p>Following census data are available for estimation of water demand for the year 2040. Estimate the water requirement assuming the rate of water supply is 180 lpcd.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Year :-</td> <td style="width: 15%;">1970</td> <td style="width: 15%;">1980</td> <td style="width: 15%;">1990</td> <td style="width: 15%;">2000</td> <td style="width: 15%;">2010</td> </tr> <tr> <td>Population</td> <td>80</td> <td>120</td> <td>168</td> <td>228</td> <td>265</td> </tr> <tr> <td colspan="6">In thousand.</td> </tr> </table> <p>Use graphical, incremental increase, decrease rate of increase method.</p>	Year :-	1970	1980	1990	2000	2010	Population	80	120	168	228	265	In thousand.						12
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Population	80	120	168	228	265															
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Q3.	<p>In a water treatment plant, the pH values of incoming and outgoing water are 7.2 and 8.4 respectively. Assuming a linear variation of pH with time, determine the average pH value of water.</p>	4																		
(a)																				
(b)	<p>What do you mean by water quality?</p>	3																		
(c)	<p>Write down the important bacteriological characteristics of water quality parameters.</p>	4																		
(d)	<p>What do you understand by hardness of water? Why it is undesirable? Mention the desirable and permissible values of hardness, chloride and iron. in potable water.</p>	5																		
(e)	<p>What is E-Coli Index? How you can determine the above index? Use suitable example</p>	4																		

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No. of Questions		Marks
Q 4.	What are the major pollutants in water supply sources?	
(a)	Describe with necessary flow sheet different types of unit operation for making water fit for potable purposes for river and lake water sources.	10
(b)	Derive an expression for determine settling velocity of a particle in quiescent water.	5
(c)	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.	5
Q5.	Discuss the theory of an Ideal Settling Basin. What is its significance?	6
(a)	Distinguish between discrete and flocculent settling	3
(b)	What is the purpose of adding coagulants? Why lime is added at times with alum for chemical sedimentation?	4
(d)	Alum, $Al_2(SO_4)_3 \cdot 18H_2O$ 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 10mg/l, as $CaCO_3$, how much $Ca(OH)_2$ shall be required daily for optimum coagulation? The alum dose is 40mg/l	7
Q 6.	With the help of a neat sketch explain the operation principle of rapid gravity sand filter.	10
(a)	Show different valves for operation of the filter	
(b)	Calculate the dosage in mg/l required to disinfect a flow of 260,000Lit/day, if 1 kg of bleaching powder of 35% strength is required to be used.	4
(c)	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.	6