B.E. CIVIL ENGINEERING (PART TIME) IIIRD YEAR EXAMINATION, 2018
III RD YEAR, 1ST Semester Examination (OLD)

SUBJECT: WATER SUPPLY ENGINEERING

Full Marks 30/100

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

No. of Questions	(Marks:100)	Marks
	Answer any five(5) questions Assume any relevant data if not given.	
Q1. (a)	Write down various methods for forecasting future population.	3
(b)	Compute the "fire demand" for a city with population of 1,40000 using different formula.	4
(c)	Calculate maximum factor on average consumption basis of water for monthly wise using Goodrichs formula.	3
(d)	As per census data for the years 1960 to 2010, the population of a town is given below;- Year:- 1960 1970 1980 1990 2000 2010 Population:- 72 85 110.50 144 184 221 In thousand Estimate the future population in 2036. Use following methods:- I. Geometrical increase. ii. Graphical extension	10
Q2. (a)	Explain briefly various factors that affect in rate of capita demand.	4
(b)	In two periods, each of 20 years the city population grew from 30000 to 172000 hence 292000. Determine a) Saturation population b) The co efficient of logistic equation c) equation of logistic curve. d) Expected population in the next 20 years. Determine also coincident demand for the city for design of water supply scheme.	16
Q3. (a)	What is the importance in pH value in water? Give the permissible range of pH value in potable water.	3

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b)	Explain double layer ionic theory on colloid stability in water.		Q6.
(c)	The measured pH values of incoming and outgoing waters in a water treatment plant are 7.3 and 8.5 respectively. Determine the average pH of water assuming linear variation of pH with time.	.	(a) (b
(d)	Discuss the following water quality parameters in drinking water treatment: - i) Dissolved solids ii.) Coliform Index iii)turbidity		(c
Q4. (a)	Draw a neat flow diagram for water treatment plant considering river water is the source of supply. Justify the purpose of providing the each unit.		
(b)	Derive Stokes law for determining settling velocity of particles in water? Estimate the settling velocity of a spherical silica particle of specific gravity 2.70 in water at 25^0 C, if the diameter of the particle is 0.04 cm Assume 0.009 cm2/sec. Check also the validity of the equation applied for solving the problem.		
(c)	What is the purpose of adding coagulants? Why lime is added at times with alum for chemical sedimentation.		
(d)	Discuss the mechanism of granular bed filtrations.		
Q5. (a)	With the help of a neat sketch explain the operation principle of rapid gravity sand filter. Show different valves for operation of the filter and backwashing process. Why stand by number of filter bed is necessary.		
(b)	What do you understand by bacterial impurities in drinking water? How it is parametrically assessed?		
(c)	Write down relative water quality in ground water and surface water.		
(d)	Alum , Al2 (SO4)3, 18 H2O, is to be used for coagulation purpose in a water treatment plant with a capacity of 2 million litre per hour. The raw water has a natural alkalinity 0f 22mg/l,as		

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Time: ~~Two hours~~/Three hours/~~Four hours/ Six hours~~   Full Marks ~~30~~/100

Ma	No. of Questions	(Marks:100)	Marks
		CaCO3, how much Ca (OH)2 shall be required daily for optimum coagulation? The alum dose is 40mg/l.	
	Q6.		
ment ming	(a)		4
	(b)	What is Chicks law in connection to disinfection kinetics of water.?	6
is the		Laboratory test on a sample of water indicate that a chlorine dose of 1.8 mg/l is to be used in order to destroy 99.90% of pathogen in a contact time of 20 min. It is decided that hypochlorite with 28 % available chlorine shall be used to obtain 99.99 % kill of pathogens in a contact time	
.70 in 2/sec.	(c)	of 30 mins. Estimate the amount of the hypochlorite (60%pure) required for treatment of 7500m³/day of water. Assume n=1.2. For a town, daily requirement of water for supply to the population is 2 lakh Liters. The pattern of draw off is as follows:-	
alum		6 am – 9am- 30% of days supply 9am - 4 pm – 35% of days supply 4 pm - 7 pm- 25% of days supply 7 pm - 6pm -10% of days supply The pumping is done for 10hrs a day from 8 to 6 pm. Determine the storage capacity of the distribution reservoir for the water supply scheme.	10
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nt plant 2mg/l,as			

(Marks:100)