Degree/5th/UCE 504

2024
Environmental Engineering-I

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	How will you estimate the quantity of water required by a town while arranging a water supply scheme for the same. Discuss the various expression used to determine the fire demand.	10
	b)	Classify various types of filters. Explain the various actions takes place during filtration process. Explain in brief the various filter troubles.	10
2.	a)	What are the common impurities found in natural sources of water and their effects upon its quality.	5
	b)	Describe in brief various tests conducted for physical examination of raw water	15
3.	a)	Explain in brief different methods used for prediction of future population of a city.	12
	b)	What are the requirements of good distribution system? Discuss with the help of diagram, various method of layout of distribution system.	8
4.	a)	What is meant by per capita demand and design period? Mention the design period for the different components of a water supply scheme. What are the various factors that affects the per capita demand of water	8
	b)	Define aquifer. Derive an expression for discharge for a well in unconfined aquifer	8
	c)	Explain the working of exposed river intake.	4
5.	a)	Design completely a rapid sand filter for treating water required for a population of 50,000, rate of supply being 180 litres per day, rate of filtration 5200 litres per m^2, assumed 4 % of filtered water is used every day for backwashing and 30 minutes are lost every day during backwashing for a town.	15
	b)	Show that the settling velocity of a spherical particle in a liquid under condition when Reynold's number less than 0.5 may be given by the expression $V_s=g/18(Gs-1)\, d^2/\upsilon$.	5
6.	a)	Explain the sedimentation process used in a water treatment plant. What do you understand by coagulation and flocculation?	08

b) Predict the population for the year 2041 from the following population data by geometric increase method: 6

Year	1961	1971	1981	1991	2001	2011
Population: (thousands)	72	85	110	144	184	221

c) Find the dimension of a rectangular sedimentation tank basin for the follows data: 6

Volume of water to be treated = 3 MLD, Detention time = 4 hours, velocity of flow=10 cm/min.