Enrollment No: _____ Exam Seat No: _____

C.U. SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Water and Wastewater Engineering

Subject Code: 4TE06WWE1 Branch: B.Tech (Civil)

Semester: 6 Date: 30/10/2018 Time: 02:30 To 05:30 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions** **(14)**

a) Enlist the classification of sedimentation tank based on nature of working. (1)
b) Which is the suitable method for forecasting population for a young and a rapidly growing city? (1)
c) What is the full form of ESR? (1)
d) Draw a flow chart of step aeration process. (1)
e) Define Discrete particle. (1)
f) Drinking water will be safe if its B.O.D is…… (1)
g) What is the detention period for septic tank? (1)
h) Water losses in water supply system are assumed as…….. (1)
i) What is Incineration? (1)
j) Define Anti-Siphonage pipe. (1)
k) Name the cheapest water distribution system. (1)
l) Enlist the chemical used for coagulation. (1)
m) What is the average domestic water consumption per capita per day for an Indian city as per IS:1172? (1)
n) What is self-cleansing velocity? (1)

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

A) The following is the population data of a city, available from past census records. **(7)**

Year	1941	1951	1961	1971	1981	1991	2001
Population	12000	16500	26800	41500	57500	68000	74100

Determine the population of the city in 2021 by
(a) Arithmetical increase method
(b) Geometrical increase method
(c) Incremental increase method

B) Draw a complete flow diagram of wastewater treatment plant and describe the function of each unit. **(7)**

Q-3		**Attempt all questions**	**(14)**
	A)	What are the factors affecting per capita demand.	**(2)**
	B)	Enumerate the factors governing the location of an intake.	**(5)**
	C)	Design a sludge digestion tank for 50,000 people. The sludge content per capita per day is 0.068 kg. The moisture of the sludge is 95%. The sp. Gravity of the wet sludge is 1.02 and 3.5% of the digester volume is daily filled with the fresh sludge which is mixed with the digested sludge.	**(7)**
Q-4		**Attempt all questions**	**(14)**
	A)	Explain in water treatment plant with neat sketch.	**(7)**
	B)	Determine the velocity of flow in a sewer running one half full. The sewer is laid at 1 in 550 slope. The diameter of the sewer is 1.5 m. Also determine the discharge flowing through the sewer. Assume N=0.012 in Manning's formula. It is self-cleansing?	**(7)**
Q-5		**Attempt all questions**	**(14)**
	A)	Explain Centrifugal pump with neat sketch.	**(7)**
	B)	What are the requirements of an ideal distribution system? Describe in brief various types of distribution system.	**(7)**
Q-6		**Attempt all questions**	**(14)**
	A)	Write a short notes on "Joints" in Sewer.	**(7)**
	B)	Describe the working of trickling filters with sketch and discuss the formation of slime layer in it.	**(7)**
Q-7		**Attempt all questions**	**(14)**
	A)	How to determine the optimum dose of coagulant in the given sample by Jar Test?	**(7)**
	B)	Define slow sand and rapid sand filters and give point wise comparison between them.	**(7)**
Q-8		**Attempt all questions**	**(14)**
	A)	Define: (1) Garbage (2) Soil Pipe (3) Sewage (4) Storm water (5) Waste Pipe (6) Sullage (7) Dry weather flow	**(7)**
	B)	Design a sedimentation tank for a water works, which supplies $1.4*10^6$ litre/day water to the town. The sedimentation period is 5 hours, the velocity of flow is 12 cm/minute, depth of water in the tank is 4.0m. Assuming an allowance for sludge is to be made as 80 cm.	**(7)**