Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2134004 Date: 18/06/2019

Subject Name:Green Chemistry & Technology

Time: 02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	(a)	The Clariflocculator is the unit in which.....occurs.	01
	(b)	Breakpoint chlorination of water involves addition of chlorine in an amount sufficient to.....	01
	(c)	Flocculation is a process that.....	01
	(d)	..... is the one that is most commonly used for disinfection of waste water	01
	(e)	Aeration of water is done to remove.....	01
	(f)	..... is a rapid test to indicate the pollution in river water.	01
	(g)	High COD to BOD ratio of an organic pollutant represents.....	01
	(h)	If COD of a sample is always greater than BOD, it represents.....	01
	(i)	The blue baby syndrome is caused by consumption of..... in water.	01
	(j)	The temporary hardness of water is caused by	01
	(k)	..... is most important water quality parameter for domestic use of water.	01
	(l)	..... is caused due excessive drinking of fluoride in water.	01
	(m)	The non-carbonate hardness of sample in mg/L as $CaCO_3$ is	01
	(n)	Turbidity value obtained by turbidity meter, which works on ..... principle, is expressed in	01
Q.2	(a)	What is green technology? How has this technology proved to be environment friendly in the agriculture and transport sectors?	03
	(b)	Mention various methods used to dispose solid wastes along with their merits and demerits.	04

(c) Determine the surface area for setting tank for 0.5 m^3/s flow using design overflow rate as 32.5 $m^3/m^2/day$. Also find the depth of tank if detention time is 95 min. assume L/B 2:1 to L/B=5:1 and length of tank should not exceed 100 m. 07

OR

Q.2 (a) What are twelve basic principles of green chemistry? 03

(b) Design the settling tank(s) for the city of Stillwater's water treatment plant expansion using the design overflow rate found in 32.5 $m^3/day\ m^2$. The maximum day design flow is 0.5 m^3/s. Assume a water temperature of 10 ^0C. 11

Q.3 (a) Describe the wind energy with advantage and disadvantage 03

(b) What are renewable and non-renewable resources? Differentiate between renewable and non-renewable energy sources. 04

(c) A water treatment plant treats 10 MLD of raw water, the dose of alum is 18ppm. Determine 07
i. total quantity of alum per year.
ii. total quantity of CO_2 gas developed per year
iii. total quantity of floc per year
iv. total quantity of hardness

OR

Q.3 (a) Describe the tidal energy with advantage and disadvantage. 03

(b) Define nuclear fission and fusion. Explain the brief description of nuclear energy with merits and demerit. 04

(c) Using given information find the population of the city in 2040 using 07
i. Arithmetic increase method and
ii. Geometric increase method

year	1940	1950	1960	1970	1980	1990	2000
population	70000	98060	105000	125489	137894	178545	213233

Q.4 (a) Define air pollution. Write the dangerous effects of leads and arsenic poisoning on human health? 03

(b) Write short notes on the following: 04
i. Carbon monoxide & Ozone depletion.
ii. Greenhouse effect and gases responsible for greenhouse gases
iii. Oxide of Sulphur (SOx) & Oxide of Nitrogen (NOx)
iv. PAN

(c) i. What are the main objectives of integrated waste management? 02

ii. What is settling velocity? 05
Find the settling velocity of spherical silica particles (0.004 cm diameter) of specific Gravity 2.67 in water at 25°C.Take viscosity as 0.9 Centipoise.

OR

Q.4 (a) Describe the solar energy with advantage and disadvantage. 04

(b) What is geothermal energy? Discuss its merits and demerits. 04

(c) Describe with neat sketch the construction of biogas plant. 06

Q.5 (a) What is acid rain and what are its effects on the environment? Enlist the gases responsible for the acid rains. 03

(b) What is water pollution? Discuss the major sources of water pollution. Discuss various remedial measures to minimize water pollution. 04

(c) During BOD test conducted on a 5% dilution of waste, the following observations were taken. 07

i. DO of aerated water used for dilution = 3.6 mg/l
ii. DO of original sample = 0.8 mg/l
iii. DO of diluted sample after 5 day incubation = 0.7 mg/l

Compute 5 day BOD and Ultimate BOD. Assume deoxygenation constant at test temperature as 0.12.

OR

Q.5 (a) Define BOD, COD, DO. Among the BOD and COD, which one of these is a better parameter for determining the strength of polluted waste water and why? 03

(b) List important environmental laws of India and explain carbon credits? 04

(c) Write short notes on: 07

i. Rapid sand filter & Slow sand filter

ii. Trickling filter

iii. Screening

iv. Aeration

v. Coagulation

vi. Chlorination

vii. Flocculation

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