P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination (Backlog)

December 2022

SESH1230 Fundamentals of Chemistry & Chemical Engineering

02.12.2022, Friday **Time: 01:00 p.m. To 03:30p.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures with **Pencil** wherever required.
4. Use of scientific calculator is allowed.

			CO	BTL
	SECTION – I			
Q - 1 (a)	Define chemical bond and state types of chemical bond.	[04]	1	1
Q - 1 (b)	A sample on water analysis has been found to contain following: $Ca(HCO_3)_2$ =10.5 ppm, $Mg(HCO_3)_2$= 12.5 ppm, $CaSO_4$= 7.5 ppm, $CaCl_2$= 8.2 ppm and $MgSO_4$= 2.6 ppm. Calculate the temporary, permanent and total hardness. (Atomic. Wt., Ca=40, Mg= 24, S=32, C=12, O=16, Cl=35.5 & H=1)	[06]	1	5
Q - 2 (a)	Explain hydrogen bond and its types.	[05]	1	4
Q - 2 (b)	What is scale formation and how will you remove scale?	[05]	5	2
Q - 3 (a)	Explain cold lime-soda process for softening of water.	[05]	5	4
Q - 3 (b)	Explain five different conductometric titrations for different combinations of acid and base with suitable diagram.	[05]	1	4
	OR			
Q - 3 (a)	Explain in brief the hydrolysis of salts.	[05]	1	4
Q - 3 (b)	Explain in brief the Ionic Mobility and method for direct determination of ionic mobility.	[05]	3	4
	SECTION – II			
Q - 1 (a)	State Fourier's law and explain conduction in metals, liquids and gases.	[05]	3	2
Q - 1 (b)	Explain Natural and Forced convection using Newton's law of cooling.	[05]	6	4
Q - 2 (a)	Explain molecular diffusion in gases with Fick's law.	[05]	5	4
Q - 2 (b)	What is chemical reaction? State different types of reaction and explain any one type.	[05]	6	2

Q - 3 (a)	Define rate of reaction and state factors affecting the rate of reaction.	[05]	6	6
Q - 3 (b)	It is desired to make 1000 Kg of a solution containing 35 % by weight of substance A. Two solutions are available, one containing 10 % by weight A and other containing 50 % by weight A. How many Kg of each solution will be required?	[05]	1	5
	OR			
Q - 3 (a)	Define: Thermodynamics, system, boundary and surroundings.	[05]	2	6
Q - 3 (b)	Draw the following Flowsheet symbols: Centrifugal Pump, Shell & Tube Heat Exchanger, Condenser, Tray column, Gate Valve	[05]	5	6

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CO: Course Outcome Number BTL: Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create