P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination

January 2022

SESH1230 Fundamentals of Chemistry & Chemical Engineering

25.01.2022, Tuesday **Time: 09:00 a.m. To 11:30 a.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.

SECTION – I

Q - 1 (a)	Explain Lewis Octet Rule along with the limitations.	**[05]**
Q - 1 (b)	Explain the properties of ionic compounds	**[05]**
Q - 2 (a)	Explain valence bond theory with two examples	**[05]**
Q - 2 (b)	Explain reverse osmosis for desalination of brackish water.	**[05]**
Q - 3 (a)	Explain hot lime-soda process for softening of water.	**[05]**
Q - 3 (b)	State the postulates of Arrhenius Theory with limitations.	**[05]**
	OR	
Q - 3 (a)	Explain the concept of Molar conductance	**[05]**
Q - 3 (b)	A sample on water analysis has been found to contain following: $Ca(HCO_3)_2$ =10.5 ppm, $Ca(HCO_3)_2$= 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)	**[05]**

SECTION – II

Q - 1 (a)	Define: Thermodynamics, system, boundary and surroundings.	**[05]**
Q - 1 (b)	Draw the following Flowsheet symbols: Centrifugal Pump, Shell & Tube Heat Exchanger, Evaporator, Tray column, Gate Valve	**[05]**
Q - 2 (a)	Define heat transfer and give the applications of heat transfer.	**[05]**
Q - 2 (b)	What is chemical reaction? State different types of reaction and explain any one type.	**[05]**
Q - 3 (a)	Define rate of reaction and state factors affecting the rate of reaction.	**[05]**
Q - 3 (b)	State different types of systems and explain any one type of system.	**[05]**
	OR	
Q - 3 (a)	Explain molecular diffusion in gases with Fick's law.	**[05]**
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]**

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