P P SAVANI UNIVERSITY

First Semester of B. Tech. Examination

January 2023

SESH1230 Fundamental of Chemistry & Chemical Engineering

10.01.2023, Tuesday **Time: 10:00 a.m. To 12:30 p.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 wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

			CO	BTL
Q - 1	Short Question (Any Five)	**[05]**		
(i)	What is Sol?		**3**	**1**
(ii)	What is Solution?		**3**	**1**
(iii)	Define Lone pair		**1**	**1**
(iv)	What is caustic embrittelement?		**4**	**1**
(v)	What is Faraday?		**4**	**1**
(vi)	What is Sigma & π bond?		**1**	**1**
(vii)	What is Electrolysis?		**4**	**1**
Q - 2 (a)	What is chemical bond? Give types of bonds.	**[05]**	**1**	**2**
Q - 2 (b)	What is the special feature of Ionic or electrovalent bond?	**[05]**	**1**	**2**
	OR			
Q - 2 (a)	What is covalent bond? Give examples of single, double and triple covalent bond.	**[05]**	**1**	**2**
Q - 2 (b)	Explain Arrhenius ionic theory.	**[05]**	**4**	**2**
Q - 3 (a)	What is scale formation and how will you remove scale?	**[05]**	**3**	**2**
Q - 3 (b)	Explain Kohlrausch's Law with applications.	**[05]**	**4**	**2**
	OR			
Q - 3 (a)	Explain the concept of pH and pOH.	**[05]**	**1**	**2**
Q - 3 (b)	Explain any five impurities in water.	**[05]**	**4**	**2**
Q - 4	Attempt any one.	**[05]**		
(i)	Discuss Faraday tyndall effect.		**3**	**2**
(ii)	Explain any one method of purification of colloids in detail.		**3**	**2**

SECTION – II

Q - 1	Short Question (Any Five)	**[05]**		
(i)	What is chemical kinetics?		**5**	**2**
(ii)	Define Rate constant.		**5**	**1**
(iii)	Write down Law of conservation of mass.		**5**	**2**
(iv)	What is Heat? Write down it's units.		**6**	**2**
(v)	Give classification of material balance problem.		**6**	**2**
(vi)	Define: Thermodynamics, system, boundary and surroundings		**2**	**1**
(vii)	Define: Distillation, Extraction, Drying, Dilution		**6**	**1**
Q - 2 (a)	Explain Natural and Forced convection using Newton's law of cooling.	**[05]**	**6**	**2**
Q - 2 (b)	State Fourier's law and explain conduction in metals, liquids and gases.	**[05]**	**6**	**2**
	OR			
Q - 2 (a)	Draw the following flowsheet symbols: Centrifugal Pump, Shell & Tube Heat Exchanger, Condenser, Tray column, Gate Valve	**[05]**	**5**	**2**

Q - 2 (b)	Explain: Heat of reaction, Standard heat of formation and standard heat of combustion.	[05]	6	2
Q - 3 (a)	Discuss Classification of chemical reaction in detail with examples.	[05]	5	2
Q - 3 (b)	Give difference between elementary and non-elementary reactions.	[05]	5	2
	OR			
Q - 3 (a)	Describe the material balance of the evaporation operation.	[05]	6	2
Q - 3 (b)	Describe the material balance over Crystallisation operation.	[05]	6	2
Q - 4	Attempt any one.	[05]		
(i)	Define: Stoichiometric co-efficient, Limiting reactant, Excess reactant, Conversion, Yield, Selectivity		5	2
(ii)	What is chemical reaction? State different types of reaction and explain any one type.		5	2

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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