P P SAVANI UNIVERSITY

Fourth Semester of B. Tech. Examination

May 2019

SECH2061 Physical, Inorganic & Analytical Chemistry

17.05.2019, Friday **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 wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1	Fill in the blanks / Short Questions (All Compulsory)	**[05]**
(i)	During the Karl Fischer titration, _____ is added to sample and amount of _____ consumed during the sampling is measured.	
(ii)	_____ instrument is used to determine the potential difference between a reference electrode and indicator electrode.	
(iii)	Give name of two indicator electrodes ?	
(iv)	For one component system like water, maximum number of degree of freedom is _____.	
(v)	At eutectic point for Pb-Ag system, degree of freedom will be _____.	
Q - 2 (a)	Describe the working principle of SEM analysis with construction.	**[05]**
Q - 2 (b)	Describe the working phenomena of FTIR analysis.	**[05]**
	OR	
Q - 2 (a)	Describe the working principle of TEM analysis with construction.	**[05]**
Q - 2 (b)	Explain coulometric method of end point detection in Karl Fischer analysis.	**[05]**
Q - 3 (a)	How the disposal of nuclear waste can be recovered and which are the methods to reduce it.	**[05]**
Q - 3 (b)	Explain the principles of Green chemistry in details.	**[05]**
	OR	
Q - 3 (a)	Differentiate between nuclear fission and nuclear fusion.	**[05]**
Q - 3 (b)	Describe the adipic acid manufacturing process along with usage.	**[05]**
Q - 4	Attempt any one.	**[05]**
	Define the term :- Refractive Index, Surface tension, Viscosity, parachor and Solute.	
(ii)	Classify the different concentration units with equations.	

SECTION – II

Q - 1	Short Questions	**[05]**
(i)	What do you understand by interpretation of data ?	
(ii)	What is difference between IR and UV spectroscopy.	
(iii)	Intergranular corrosion or boiler corrosion. Which is more tedious to detect and why ?	
(iv)	Give one application of DSC in the chemical industries.	
(v)	On what principle, High Performance Liquid Chromatography works ?.	
Q - 2 (a)	Elaborate on factors affecting corrosion process in the chemical industries.	**[05]**
Q - 2 (b)	Discuss the prevention methods for corrosion in details.	**[05]**
	OR	
Q - 2 (a)	Discuss electrochemical corrosion with examples.	**[05]**
Q - 2 (b)	Boiler corrosion is the biggest drawback to chemical allied industries. Explain and How ?	**[05]**
Q - 3 (a)	Draw and discuss the graph of concentration v/s absorption, Concentration v/s	**[05]**

transmission and concentration v/s wavelength in UV spectroscopy.

Q - 3 (b)	Explain the working principle and construction of NMR.	**[05]**

OR

Q - 3 (a)	Which type of data can be interpreted using Mass spectroscopy analysis ?	**[05]**
Q - 3 (b)	Differentiate between gas chromatography and liquid chromatography.	**[05]**
Q - 4	Attempt both the questions.	**[05]**
(i)	Explain the factors affecting TGA analysis.	
(ii)	Discuss the applications of TGA from research point of view.	

****