

Reg. No.

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**B. E / B. TECH.DEGREE EXAMINATIONS, MAY 2023**

Fourth Semester

**CH18405-INSTRUMENTAL METHODS OF ANALYSIS***(Chemical Engineering)**(Regulation 2018A)***TIME:3 HOURS****MAX.MARKS: 100**

- CO1** Acquire knowledge on the fundamental concepts and various terms in electromagnetic radiations and absorption spectroscopy.
- CO2** Arrive at the knowledge in the various analytical instruments which are based on electrical property of compounds.
- CO3** Obtain familiarity on various properties of liquid materials and the instruments used to measure these properties.
- CO4** Investigate the applications of spectroscopic techniques in Chemical Industry.
- CO5** Obtain the awareness in the modern techniques which are used in nanoscience.

**PART- A (10x2=20Marks)**

(Answer all Questions)

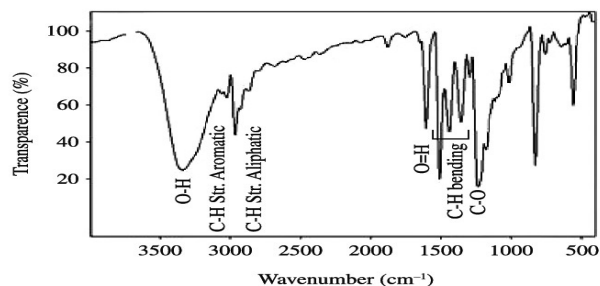
		CO	RBT LEVEL
1	Sketch an electromagnetic spectrum highlighting the wavelength and energy.	1	2
2	State Beer Lambert's Law.	1	2
3	List the advantages and disadvantages of electro analytical methods.	2	1
4	Distinguish between the equivalent and molecular conductance.	2	1
5	Interpret the significance of Scheibe-Lomak in equation.	3	2
6	Show the working of a hollow cathode lamp.	3	2
7	Compare shielded and unshielded nucleus.	4	1
8	Enumerate the chemical shift phenomenon in nuclear magnetic resonance.	4	1
9	Highlight the principle of position sensitive photo detector.	5	2
10	State Mosley's law with its significance.	5	1

**PART- B (5x 14=70Marks)**

(Restrict to a maximum of TWO subdivisions)

	Marks	CO	RBT LEVEL
11(a)	(14)	1	3

Demonstrate the characterization instrument which gives result as shown below. Describe its working principle and instrumentation using a neat diagram.



(OR)

11(b) Explain the following: Estimation of Iron & Nickel by Calorimetry. (14) 1 3

12(a) Illustrate the different types of Conductometric titrations based on the strength of acid and base. (14) 2 3

(OR)

12(b) Write in detail the components, principle, types and applications of Potentiometric analysis. (14) 2 3

13(a) Explain the principle, working and applications of Atomic Absorption Spectroscopy using a neat schematic diagram. (14) 3 4

(OR)

13(b) Illustrate the mechanism of photon emission in Inductively coupled plasma –atomic emission spectroscopy and discuss its advantage over flame photometry. (14) 3 4

14(a) Explain the working principle of mass spectrometer and discuss the various ionization methods used in it. (14) 4 4

(OR)

14(b) Explain the working of nuclear magnetic resonance spectrometer using a neat diagram. (14) 4 4

15(a) Illustrate the working of X-ray diffraction instrument for the analysis of crystalline solids. (14) 5 3

OR

15(b) Explain the principle, working and applications of scanning tunnelling microscopy using a neat schematic diagram. (14) 5 3

**PART- C (1x 10=10Marks)**

(Q.No.16 is compulsory)

	Marks	CO	RBT LEVEL
16 Explain in detail the working principle and instrumentation of the optical analytical instrument that uses refraction of light.	(10)	2	5

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