Q. Code:780772

Reg. No. | | | | | | | | | | | | | |

B.TECH. DEGREE EXAMINATIONS, MAY 2024

Fourth Semester

CH18405 – INSTRUMENTAL METHODS OF ANALYSIS

(Chemical Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Acquire knowledge on the fundamental concepts and various terms in electromagnetic radiations and absorption spectroscopy.	**2**
CO 2	Arrive at the knowledge in the various analytical instruments which are based on electrical property of compounds.	**2**
CO 3	Obtain familiarity on various properties of liquid materials and the instruments used to measure these properties.	**3**
CO 4	Investigate the applications of spectroscopic techniques in Chemical Industry.	**1**
CO 5	Obtain the awareness in the modern techniques which are used in nanoscience.	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Why aniline absorbs at λ_{max} = 230 nm, but in acid solution it absorbs at 203 nm.	**1**	**3**
2.	Why is methanol a good solvent for UV but not for IR determination.	**1**	**2**
3.	Conductance is an additive property of a solution. Give reason.	**2**	**2**
4.	Provide the similarity between solid state and precipitate membrane electrodes.	**2**	**2**
5.	Suggest the reason, in atomic absorption spectroscopy, the elements such as Al, Ti, Mo and V cannot be detected when a flame is used to produce the atomic state.	**3**	**2**
6.	Provide a suitable reason as AAS less convenient than FES with respect to qualitative scanning of samples.	**3**	**2**
7.	List out the advantages of using TMS as internal standard in NMR spectroscopy.	**4**	**2**
8.	Majority of mass spectral applications involve positive ions only. Justify.	**4**	**2**
9.	X-ray diffraction provides a convenient and practical methods for the qualitative identification of crystalline compounds. Validate it.	**5**	**3**
10.	Give the mathematical form of Bragg's equation.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	Elucidate the components and their functions of UV spectrophotometer with a neat diagram.	**(14)**	**1**	**3**
	(OR)			
(b)	Discuss the Woodword Fieser rules for the calculation of absorption maximum for α,β-unsaturated ketones.	**(14)**	**1**	**3**
12. (a)	How would you demonstrate the conduct metric titrations of a) strong acid and strong base; b) weak acid and strong base.	**(14)**	**2**	**3**
	(OR)			
(b)	Describe the amperometric titration and its applications.	**(14)**	**2**	**3**
13. (a)	Explain the principle and measurement of refractive index by using a Refratometer.	**(14)**	**3**	**3**
	(OR)			
(b)	Illustrate the theory of ICP-AES with a neat diagram.	**(14)**	**3**	**3**
14. (a)	With a neat diagram explore the instrumentation of NMR spectrometry.	**(14)**	**4**	**3**
	(OR)			
(b)	Explain the instrumentation of mass spectrometer with a neat diagram.	**(14)**	**4**	**3**
15. (a)	Discuss the various detectors used in X-ray instrument.	**(14)**	**5**	**3**
	(OR)			
(b)	How will you make use of STM for material analysis?	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Propose a method for determining the concentration of ferric ions using colorimetry.	**(10)**	**1**	**5**