A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55904

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Fifth Semester

Chemical Engineering

15UCH504- INSTRUMENTAL METHODS OF ANALYSIS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The wavelength for mid-infrared region. CO1- R

   (a) 1.4-3μm (b) 3-8 μm (c) 3-6 μm (d) 2-7 μm

2. What is the instrumental method measured by the scattering of radiation? CO1- R

   (a) Flame photometry (b) Calorimetry

   (c) Raman spectroscopy (d) Refractometry

3. When light radiation is incident on certain substances, they emit light continuously even after the incident light is cut off. CO2- R

   (a) Fluorescence (b) Phosphoresence (c) Luminescence (d) None

4. What is the source of radiation used in Raman Spectroscopy? CO2- R

   (a) Tungsten-Halogen lamp (b) Mercury arc lamp

   (c) Scoop lights (d) Neon lamp

5. NMR spectroscopy is used for determining structure in which of the following materials? CO3- R

   (a) Radioactive (b) Insoluble chemical components (c) Liquids (d) Gases

6. In mass spectrometer, the sample that has to be analyzed is bombarded with which of the following? CO3- R

   (a) Protons (b) Neutrons (c) Electrons (d) Alpha particle

7. In chromatography increases in column height,_____ in resolving power. CO4- R

(a) Decreases (b) Increases (c) Remains constant (d) Both b & c

8. _____ is used as the matrix in affinity chromatography CO4- R

(a) Lactose (b) Sucrose (c) Agrose (d) Fructose

9. Both current and potential are measured in CO5- R

(a) Potentiommetry (b) Voltammetry (c) both a& b (d)Tenasametry

10. An electrolytic cell uses electric energy to drive _____ CO5- R

(a) Chemical reaction (b) Physical reaction (c) No reaction (d) None

PART – B (5 x 2= 10 Marks)

11. Define signal to noise ratio. CO1- R

12. Define Beer's law. CO2- R

13. What is g- factor in EPR? CO3- R

14. Give applications of capillary electrophoresis CO4- R

15. What is ion-selective electrode? CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Explain the properties of electromagnetic radiation. CO1- U (16)

(i) Wavelength

(ii) Wave number

(iii) Frequency

(iv) Velocity

Or

(b) What are the types of optical instruments? Explain the principle of Fourier transform optical measurements. CO1- U (16)

17. (a) Explain the instrumentation of fluorimetry with neat diagram and Application of fluorimetry. CO2- U (16)

Or

	(b)	Explain in detail about the instrumentation of Raman spectroscopy and its Application.	CO2- U	(16)
18.	(a)	(i) Explain the instrumentation of NMR.	CO3- U	(10)
		(ii)List the causes for the chemical shift, explain any two causes.	CO3- U	(6)
		Or		
	(b)	What are the components of mass spectrometer .explain with a neat diagram.	CO3- U	(16)
19.	(a)	Explain the L-L partition chromatography and their application	CO4- U	(16)
		Or		
	(b)	Explain the theory of gas chromatography separation and its application'.	CO4- U	(16)
20.	(a)	What is voltammetry? Explain about the cyclic voltammetry.	CO5- U	(16)
		Or		
	(b)	What is STM? Explain the instrumentation of STM with neat diagram.	CO5- U	(16)