



**NAVRACHANA
UNIVERSITY**
a UGC recognized University

School: School of Science
Program: M. Sc. in Chemistry (Analytical)
Year: 2nd **Semester:** 3rd
Examination: End Semester Examination
Examination year: December - 2021

Course Code: CH211 **Course Name:** SPECTROCHEMICAL ANALYSIS-I
Date: 01/12/2021 **Total Marks:** 40
Time: 08:30 am to 10:30 am **Total Pages:** 2

Instructions:

- Write each answer on a new page.
- Use of a calculator is permitted.
- *COs=Course Outcome mapping. #BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs*	BTL#																																																							
Q.1	Match the following (Write complete option in the answer sheet)	10																																																									
	<table border="0"> <thead> <tr> <th>Sr. No.</th> <th>Column A</th> <th>Column B</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Curie point</td> <td>a) Attenuated Total Reflection</td> <td></td> <td></td> </tr> <tr> <td>2.</td> <td>thermocouple</td> <td>b) selenium</td> <td></td> <td></td> </tr> <tr> <td>3.</td> <td>photovoltaic cell</td> <td>c) black body radiation</td> <td></td> <td></td> </tr> <tr> <td>4.</td> <td>evanescent radiation</td> <td>d) SiC</td> <td>CO1,</td> <td>BT1,</td> </tr> <tr> <td>5.</td> <td>ruby crystal</td> <td>e) epoxy resin</td> <td>CO2,</td> <td>BT2</td> </tr> <tr> <td>6.</td> <td>globar</td> <td>f) ESR spectroscopy</td> <td>CO4</td> <td></td> </tr> <tr> <td>7.</td> <td>diamagnetic anisotropy</td> <td>g) calibration of IR instrument</td> <td></td> <td></td> </tr> <tr> <td>8.</td> <td>polystyrene</td> <td>h) triglycine sulphate</td> <td></td> <td></td> </tr> <tr> <td>9.</td> <td>cantilever</td> <td>i) Atomic Force Microscopy</td> <td></td> <td></td> </tr> <tr> <td>10.</td> <td>diffraction grating</td> <td>j) δ value</td> <td></td> <td></td> </tr> </tbody> </table>	Sr. No.	Column A	Column B			1.	Curie point	a) Attenuated Total Reflection			2.	thermocouple	b) selenium			3.	photovoltaic cell	c) black body radiation			4.	evanescent radiation	d) SiC	CO1,	BT1,	5.	ruby crystal	e) epoxy resin	CO2,	BT2	6.	globar	f) ESR spectroscopy	CO4		7.	diamagnetic anisotropy	g) calibration of IR instrument			8.	polystyrene	h) triglycine sulphate			9.	cantilever	i) Atomic Force Microscopy			10.	diffraction grating	j) δ value					
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Q.2	Fill in the blanks	5																																																									
	<ol style="list-style-type: none"> The image formed by moving electron beam along X and Y axis is called as Total degrees of freedom for vibration in fullerene C₆₀ is Wavelength corresponding to frequency 1500 cm⁻¹ is The small constant response of a detector even in absence of radiation is called as The region between 1500-650 cm⁻¹ in IR spectrum is referred to as 		CO1, CO2, CO4	BT1, BT2, BT3, BT4, BT5																																																							

Q.3 Answer the following

6

(a) Give full forms of DRIFTS, NOE, COSY and ELDOR.

CO2, BT1,
CO5, BT2,
BT5

(c) Explain why Stoke's lines are more intense than antiStokes lines in Raman spectrum.

Q.4 Explain **any three** of the following

9

(a) Any three applications of ESR spectroscopy

CO1, BT1,
CO2, BT2,

(b) Auger spectroscopy

CO4, BT3,
CO5, BT4

(c) Job's Method of Continuous Variation.

(d) Attenuated Total Reflectance spectroscopy

Q.5 Answer **any two** of the following

10

(a) Explain DEPT technique for structure elucidation using NMR.

CO1, BT1,
CO2, BT2,
CO3, BT3,
CO5, BT4,
BT5

(b) Explain sampling techniques for solid, liquid and gaseous samples in IR spectroscopy.

(c) Differentiate between Raman and infrared spectroscopy.

*****End of Question Paper*****