Enrollment No._____

**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:** 02/12/2022 **Total Marks:** 40
**Time:** 2:30 to 4:30 pm **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** | | |

| Sr. No. | Column A | Column B |
|---|---|---|
| 1. | calibration of IR instrument | a) Scanning Tunneling Microscopy |
| 2. | thermocouple | b) selenium |
| 3. | photovoltaic cell | c) Attenuated Total Reflection |
| 4. | diffraction grating | d) SiC |
| 5. | ruby crystal | e) epoxy resin |
| 6. | globar | f) ESR spectroscopy |
| 7. | diamagnetic anisotropy | g) polystyrene |
| 8. | Curie point | h) triglycine sulphate |
| 9. | Constant height mode | i) black body radiation |
| 10. | evanescent radiation | j) δ value |

CO1, CO2, C04 — BT1, BT2

**Q.2** Fill in the blanks **5**

1. The small constant response of a detector even in absence of radiation is called as ……..

2. ESR is also referred to as ……

3. Wavelength corresponding to frequency 1720 $cm^{-1}$ is ……

4. The image formed by moving electron beam along X and Y axis is called as ……

CO1, CO2, CO4 — BT1, BT2, BT3, BT4, BT5

5. The region between 1500-650 $cm^{-1}$ in IR spectrum is referred to as .....

**Q.3** Answer the following 6

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

(b) Give basic difference between NMR and ESR techniques. CO2, CO5 BT1, BT2, BT5

(c) Explain mull and solid film techniques in IR spectroscopy.

**Q.4** Explain **any three** of the following 9

(a) Atomic Force Microscopy

(b) Job's Method of Continuous Variation. C01, CO2, CO4, CO5 BT1, BT2, BT3, BT4

(c) Any three applications of ESR spectroscopy

(d) Auger spectroscopy

**Q.5** Answer **any two** of the following 10

(a) Sampling techniques for solid, liquid and gaseous samples in IR spectroscopy.

(b) Differentiate between Raman and infrared spectroscopy. CO1, CO2, CO3, CO5 BT1, BT2, BT3, BT4, BT5

(c) DEPT technique for structure elucidation using NMR.

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