



**B.Sc. V Semester Degree Examination, Sept./Oct. - 2024**

**CHEMISTRY**

**DSC - 5 : Inorganic Chemistry and Spectroscopy**

**(NEP)**

Time : 2 Hours

Maximum Marks : 60

---

*Note :* Answer **all** the sections.

---

**SECTION - A**

1. Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**
- |   |   |
|---|---|
| (a) What is symbiosis ?                   | 1 |
| (b) What are zeolites ?                   | 1 |
| (c) Define nuclear potential.             | 1 |
| (d) What is magic number ?                | 1 |
| (e) What is emission Spectroscopy ?       | 1 |
| (f) Define fundamental vibrations.        | 1 |
| (g) State Born-oppenheimer approximation. | 1 |
| (h) What is Raman effect ?                | 1 |
| (i) What is chemical shift ?              | 1 |
| (j) What is mass Spectroscopy ?           | 1 |

**SECTION - B**

Answer **any four** of the following questions. Each question carries **five** marks.

**4x5=20**

- |  |   |
|--|---|
| 2. Explain structure and bonding in diborane.                                | 5 |
| 3. Explain salient features of Nuclear shell model.                          | 5 |
| 4. Discuss the applications of IR Spectroscopy in functional group analysis. | 5 |
| 5. Discuss the fundamental frequencies for vibrational Spectroscopy.         | 5 |
| 6. Explain vibrational Raman Spectra.  | 5 |
| 7. Explain the different scales of NMR Spectroscopy.                         | 5 |



**P.T.O.**

## SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks.

**3x10=30**

- 8.** (a) What is HSAB principle ? Explain the basis of HSAB concept. **6**  
(b) Explain the wades rules. **4**
- 9.** (a) Explain the classification of nuclides based on Z and N. **6**  
(b) Write a note on liquid drop model. **4**
- 10.** (a) Discuss Woodward's rules for the calculation of  $\lambda_{\text{max}}$  with example. **6**  
(b) Explain fundamental and non-fundamental vibrations. **4**
- 11.** (a) Explain Energy level diagrams of Rotational Spectra. **6**  
(b) Discuss Morse potential equation for vibrational Spectroscopy. **4**
- 12.** (a) Explain instrumentation and applications of mass Spectroscopy. **6**  
(b) Discuss the principles of NMR Spectroscopy. **4**

- o o o -

