No. of Printed Pages : **2**

21BSC5C5CHL

B.Sc. V Semester Degree Examination, April/May - 2024

CHEMISTRY

V : DSC - 5 : Inorganic Chemistry and Spectroscopy

(NEP)

Time : 2 Hours Maximum Marks : 60

Note : *Answer* ***all*** *questions.*

SECTION - A

1. Answer the following Sub-questions. Each sub-question carries **one** mark. **10x1=10**

(a) What are Zeolites ?

(b) State HSAB concept.

(c) What are isotopes ?

(d) Define Quarks.

(e) What is absorption spectroscopy ?

(f) Calculate the number of vibrations in CO_2 molecule.

(g) What is Raman effect ?

(h) What is molecular spectroscopy ?

(i) How many proton NMR signals would you expect for $CH_3CH_2CH_3$?

(j) What is Larmor frequency ?

SECTION - B

Answer **any four** of the following questions. Each question carries **five** marks. **4x5=20**

2. Write the preparation and structure of Borazine.

3. Discuss the liquid model of nucleus.

4. Explain significance of finger print region.

5. Discuss the Raman effect based on Quantum theory of radiation.

6. Explain chemical shift write the different scales.

7. Discuss the anisotropic effect in NMR spectroscopy.

P.T.O.

SECTION - C

Answer **any three** of the following questions. Each question carries **ten** marks. **3x10=30**

8. (a) Write the classification and structure of silicates. **6**

(b) Write any four applications of HSAB concept. **4**

9. (a) Explain nuclear deformation due to nucleons outside filled shells with respect to collective model of nucleus. **6**

(b) Write a note on secular and transient equilibrium. **4**

10. (a) Explain different electronic transitions in UV spectroscopy. **6**

(b) Discuss Wood ward rules for the calculation of λ_{max} with examples. **4**

11. (a) Write a note on the vibrational spectroscopy for a diatomic molecule behaving like simple harmonic oscillator. **6**

(b) Explain briefly vibrational Raman spectra. **4**

12. (a) Discuss the principles of NMR spectroscopy. **6**

(b) Explain the methods of fragmentation in mass spectroscopy. **4**

- o O o -