

CS | 2111

11718 | NM

CHEMISTRY- 5- CODE: BHB27

(SEMESTER -V)

Time -3hrs

Max. Marks: 74

Note: Attempt two questions each from section A and B carrying 11 marks each and the entire section C consisting of 15 short answer type questions carrying 2 marks each.

SECTION ---A

- 1 (a) Distinguish between NMR and Electronic Spectroscopy. 5  
(b) Most of the absorption bands in UV-Visible spectra are very broad. Why? 6
2. (a) Define the terms: Bathochromic shift and Molar absorptivity. 5  
(b) Explain the principle of UV-Visible spectroscopy. 6
3. (a) Explain : Shielding and deshielding in NMR. 6  
(b) Write short note on: Red and Hypochromic shift. 5
4. (a) Explain the types of molecules which give Electronic spectra. 5  
(b) Explain the statement of Born-Oppenheimer approximation. 6

SECTION --B

- 5 (a) Explain the principle and working of IR spectrophotometer giving its neat diagram. 6  
(b) Derive Hamiltonian operator from Schrodinger wave equation for H-atom. 5
- 6 (a) Discuss: Importance of Schrodinger wave equation and Photoelectric effect. 6  
(b) Explain the applications of IR spectroscopy for the analysis of molecule. 6
- 7 (a) Compare IR and Raman spectra with suitable example. 5  
(b) Explain the separation of Schrodinger wave equation into three equations. 6
- 8 (a) Explain radial and angular wave functions? 5  
(b) Write short notes on: functional group and polarizability. 6

SECTION C

9. Attempt all questions:
- Write brief introduction of the vibrational spectroscopy.
  - What is the scope of IR spectroscopy?
  - What is a paramagnetic substance?

- d. Distinguish between Stokes and Anti-Stokes lines?
- e. What is the range of Raman shift?
- f. What is the advantage of IR spectroscopy over conventional chemical analysis?
- g. What is magnetic moment ?
- h. How many normal mode of vibrations are possible for benzene?
- i. In colorimetric estimation of each metal ion in solution, a particular filter is selected. Give reason.
- j. Name the spin active nuclei which can be studied by NMR spectroscopy.
- k. What are selection rules for a molecule to be active for electronic spectroscopy?
- l. Explain Far and near IR region?
- m. What is klystron tube?
- n. What is meant by scattering?
- o. What is chemical shift?

15 x 2 = 30

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