C. ABDUL HAKEEM COLLEGE (AUTONOMOUS), MELVISHARAM - 632 509. SEMESTER EXAMINATIONS, NOVEMBER - 2018

B.Sc., CHEMISTRY SEMESTER V U14ECH501 — SPECTROSCOPY - I (ELECTIVE - I)

Time: Three Hours Maximum: 75 Marks

SECTION - A $(10 \times 2 = 20 \text{ Marks})$

Answer ALL Questions

- 1. Define the term Spectroscopy.
- 2. Give the expression for moment of inertia.
- 3. Define chromogen. Give one example.
- 4. What is the material used in cuvette for UV region?
- 5. Give two examples for IR active non-linear triatomic molecules.
- What type of transition takes place in IR Spectroscopy.
- Give the carbonyl frequency vC=O in aldehydes and ketones.
- 8. Name the types of monochromators
- 9. Which vibration of CO₂ is Raman active and IR inactive?
- 10. Give the selection rules for Raman spectroscopy

SECTION - B (5 \times 5 = 25 Marks)

Answer **ALL** Questions.

11. a) Describe line spectrum and band spectrum.

(Or)

b) Give the principle and selection rules for Microwave Spectroscopy.

- 12. a) Write briefly on the absorption laws.
- b) Give the differences between chromophore and auxochrome. Give

(Or

examples

 a) Calculate the number of fundamental vibrational modes for diatomic molecule. Give any one example.

(Or.)

- b) Taking H_2O as example, find the number of stretching and bending vibrations.
- 14. a) What are the applications of Infra-Red spectroscopy?

(Or)

- b) Interpret the IR spectra of an aliphatic alcohol and an aromatic alcohol.
- 15. a) Explain mutual exclusion principle with an example.

(Or

b) What are the advantages of Raman Spectroscopy?

SECTION - C (3 X10 = 30 Marks)

Answer ANY THREE Questions

- Discuss the different forms of energies using Born-Oppenheimer approximation.
- 17. Give the block diagram for Photocolorimeter and describe the components
- 18. Discuss on stretching and bending vibrations of CO₂ molecules in IR
- 19. a) Explain Hydrogen bonding in IR
- b) Selection rules in IR
- 20. Give the differences between Raman and Infra-Red spectroscopy.

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