(Pages : 3) S – 6824

Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, February 2024

Physics

PH : 232 ATOMIC AND MOLECULAR SPECTROSCOPY

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 75

SECTION – A

Answer any five questions. Each question carries 3 marks.

1 Describe briefly Stark effect.

2 What is meant by molecular point groups?

3 What are Auger electrons?

4 Explain the importance of microwave spectrometer.

5. Give the purpose of IR spectrometry.

6. Describe Frank-Condon principle.

7 Explain the phenomenon of Raman scattering.

8 Give the importance of NMR imaging.

(5 × 3 = 15 Marks)

P.T.O.

SECTION – B

Answer **three** questions. **Each** question carries **15** marks.

9. (a) Comment on Pauli's exclusion principle.

   (b) Give a detailed note on normal Zeeman effect and anomalous Zeeman effect.

15

OR

10. (a) Write a note on Symmetry operations involved in molecules.

    (b) Comment on photoelectron spectroscopy.

15

11. (a) Discuss on the rotational spectra of diatomic molecule.

    (b) Comment on the vibrational spectra of diatomic molecule.

OR

12. (a) What are symmetric and asymmetric top molecules?

    (b) Describe in detail Fourier transform infra-red spectroscopy.

15

13. (a) Write a detailed note on the structural determination using Raman spectroscopy.

    (b) What is meant by coherent anti-stokes Raman scattering?

OR

14. (a) Discuss on NMR instrumentation.

    (b) Write on Mossbauer spectroscopy.

15

(3 × 15 = 45 Marks)

SECTION – C

Answer any **three** questions. **Each** question carries **5** marks.

15 Find the magnetic moment of electron in the $^2P_{1/2}$ state.

16. Distinguish between normal Zeeman effect and anomalous Zeeman effect.

17. How to analyse rotational spectra?

18. What is the use of Fortrat diagram?

19. Comment on the magnetic properties of nuclei.

20. Differentiate between isomer shift and chemical shift.

(3 × 5 = 15 Marks)
