

45072

M.Sc. DEGREE EXAMINATION, MARCH/APRIL 2019.

FOURTH SEMESTER

Physics

Paper II — ANALYTICAL TECHNIQUES

Time : Three hours

Maximum : 75 marks

(No additional sheet will be supplied)

PART A — (5 × 3 = 15 marks)

Answer any FIVE questions.

Each questions carries 3 marks.

Each answer should not exceed 1 page.

1. Differentiate between point groups and space groups.
2. What is meant by reciprocal lattice? Explain.
3. What is Mossbauer effect?
4. What is meant by hyperfine interaction in ESR?
5. What are the properties of nuclear?
6. Give an examples for half integral and integral spins of nuclei.
7. Explain the principle of photo acoustic spectroscopy.
8. What is meant by energy depressive spectroscopy?

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each answer carries 15 marks.

Each answer should not exceed 6 pages.

9. What is Bragg's law? Explain the lave method and powder X-ray method to study the X-ray diffraction.

Or

10. How do you determine the lattice constant of a cubic and tetragonal structures using d-spacing?

11. What are the essential conditions to be observed to obtain the mossbauer spectrum and how is it achieved experimentally?

Or

12. Explain the phenomenon of electron spin resonance and its experimental set up.

13. What are the Bloch equations? Obtain these equations using NMR theory.

Or

14. What is NQR? How do you study the NQR using super regenerative oscillator?

15. Describe the principle and working of scanning electron microscopy.

Or

16. Explain in detail about differential scanning calorimetry and its applications.

