45072

M.Sc. DEGREE EXAMINATION, APRIL 2018.

Physics

FOURTH SEMESTER

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 of the following.

Each question carries 3 marks.

Each answer should not exceed 1 page.

1. What is the concept of Brillouin zone?

2. What is Reciprocal lattice?

3. Write about the determination of hyperfine interaction using Mossbauer spectroscopy.

4. Write about spin-spin interaction.

5. Write short note on nuclear spin.

6. What is chemical shift?

7. What are the applications of scanning electron microscopy?

8. Write the principle of photo electron spectroscopy.

PART B — (4 × 15 = 60 marks)

Answer ALL questions.

Each question carries 15 marks.

Each answer should not exceed 6 pages.

9. Write in detail about single crystal X-ray diffractometer.

Or

10. Explain the basic principle and applications of Neutron diffraction.

11. Explain the working of ESR spectrometer.

Or

12. What is recoilless emission? Give the conditions under which Mossbauer effect is most likely to occur?

13. Explain the basic principle of NMR. Discuss the role of relaxation mechanism in NMR spectroscopy.

Or

14. Write in detail about super regenerative oscillator in NQR with a neat block diagram.

15. What is the basic principle of X-ray fluorescence spectroscopy? Write a neat sketch explain about X-ray fluorescence spectroscopy and its applications.

Or

16. Write in detail the Basic principle and Block diagram of Photo Acoustic spectroscopy.