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PA—07—2024

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2024

(CBCS/New Pattern)

PHYSICS

Paper XIV

(Atomic, Molecular and Nuclear Physics)

(Saturday, 06-04-2024)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) All questions are compulsory.

(ii) Figures to the right indicate full marks.

(iii) Symbols carry usual meaning unless and otherwise stated.

1. Explain Zeeman effect in detail and obtain expression for Zeeman shift. 15

Or

(a) Draw well labelled energy level diagrams that explain vibrational spectra as diatomic molecule. 8

(b) Explain Raman effect in detail. 7

P.T.O.

2. Describe the construction and working of a cyclotron. Discuss its limitations. 15

Or

- (a) Explain nuclear transmutations by α -particles and protons. Give at least *four* reactions each. 8
- (b) Describe the conservation laws in nuclear reactions. 7
3. Write short notes on any *two* : 10
- (a) Magnetic orbital quantum number
- (b) Rotational spectra diatomic molecule
- (c) Need of particle accelerators
- (d) Nuclear fission.