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NA—07—2023

FACULTY OF SCIENCE

B.Sc. (Sixth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2023

(New/CBCS Pattern)

PHYSICS

Paper-XIV

(Atomic, Molecular and Nuclear Physics)

(Monday, 4-12-2023)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (1) *All questions are compulsory.*

(2) *Figures to the right indicate full marks.*

(3) *Symbols carry usual meaning unless and otherwise stated.*

1. Describe the quantum numbers associated with the vector atom model. 15

Or

(a) Explain Raman effect. Describe the experimental set up to study it. 8

(b) Discuss the rotational energy of a diatomic molecule. 7

2. Explain the principle of working and construction of Betatron. Derive the condition for its operation. 15

Or

(a) Explain the conservation laws in nuclear reactions. 8

(b) Explain in brief nuclear reaction kinematics and derive Q-value equation. 7

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(2)

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3. Write short notes on (any *two*) :

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- (a) Pauli's exclusion principle
- (b) Regions of electromagnetic spectra
- (c) Synchrotron
- (d) Neutron cycle.

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