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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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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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