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VA—22—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

(CBCS/New Pattern)

PHYSICS

Paper—XII

(Quantum Mechanics)

(Wednesday, 4-12-2024)

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) All symbols have their usual meaning.

(iv) Given : $h = 6.63 \times 10^{-34}$ J-s, $m = 9.1 \times 10^{-31}$ kg.

1. State and explain uncertainty principle and give any *two* applications. 15

Or

(a) Derive Schrodinger's equation in steady state form. 8

(b) Write a note on Eigen value and Eigen functions. 7

2. Derive an expression for energy of a particle in three-dimensional box. 15

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Or

- (a) Derive Schrodinger's wave equation for hydrogen atom in spherical polar co-ordinate system. 8
- (b) Explain orbital quantum number. 7
3. Write short notes on (any two) : 10
- (a) Photoelectric effect
- (b) Operators
- (c) The particle in a box wave function
- (d) Total quantum number.

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