



## Shree H.N.Shukla group of colleges

PHYSICS

T.Y.B.Sc. (Sem. V) (CBCS)

Unit Test examination

PAPER- 501

UNIT 4,5 - QUANTOM MECHANICS

DATE :

TOTAL MARKS : 30

**Instructions:** All questions are compulsory.

The right side figure indicates total marks of the question.

Draw the figure wherever necessary.

Write answers of all the questions in main answer sheets.

### SECTION-A

**Q.1: One marks questions:**

**[5 MARKS ]**

- 1 What is the orthogonality condition?
- 2 The momentum operator in three dimension is given by \_\_\_\_\_.
- 3 The ejected electron in compton effect is known by \_\_\_\_\_ electron.
- 4 What is the ground state energy for harmonic oscillator .
- 5 What is hamiltonian for linear harmonic oscillator.

### SECTION – B

**Q.2 (A): Short Questions: Write all three : [2 Marks each]**

**[6 MARKS]**

- 1 Explain : linear operator
- 2 Explain : bra and ket notation.
- 3 Derive the value [  $P_x, P_y$  ]

**Q.2 (B) : Short questions: Write all three: [3 Marks each]**

**[9 MARKS]**

- 1 explain the coherent state.
- 2 Explain the photoelectric effect.
- 3 Discuss the uncertainty principle.

**Q.2 (C): Write Detail Note on [Any two]: [5 Marks each]**

**[10 MARKS]**

- 1 Obtain the hermite' differential equation.
- 2 Obtain the simplified form for the oscillator from the schrodinger equation.
- 3 Derive the schrodinger equation for the free particle in one dimension.
- 4 Explain the compton effect.