



**DBY-003-0492004**

Seat No. \_\_\_\_\_

**B. Sc. / M. Sc. (Applied Physics) (Sem. II)  
(CBCS) Examination**

**July - 2022**

**Modern Physics - I : Paper - VII  
(New Course)**

**Faculty Code : 003**

**Subject Code : 0492004**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.  
(2) Numbers in the right margin indicate marks.

**1** Attempt any **seven** short questions : (two marks each) **14**

- (1) Give the basic postulates of Bohr's atomic structure model.
- (2) Write the equation for wavelength for Paschen series and Bracket series.
- (3) What are assumptions of Rutherford's atomic model ?
- (4) Write down selection rules for L and S.
- (5) Define Photoluminescence.
- (6) Draw a well-labelled diagram of Spectral lines of H-atom.
- (7) Write the uncertainty principle with necessary mathematical equation for uncertainty in position & time.
- (8) What was the first conclusive evidence for space quantization ?
- (9) Explain the phenomena of Fluorescence.
- (10) Explain some characteristics of the photoelectric effect from Einstein's equation.

- 2** Write answers of any **two** : (seven marks each) **14**
- (1) Discuss the developments in the atomic model stating for plum-pudding model.
  - (2) Describe Rutherford's nuclear atom model with appropriate figure.
  - (3) Explain the origin of various emission lines in H-spectra using Bohr's theory.
  - (4) Obtain an expression for the energy of the electron ( $E_n$ ) in Bohr's orbit.
- 3** Write answers of any **two** : (seven marks each) **14**
- (1) Explain Photoelectric effect with a well-labelled figure.
  - (2) What is black body radiation ? Derive an equation for energy density for a black body radiation.
  - (3) Write the difference between fluorescence and phosphorescence.
  - (4) Write a detailed note : Experimental verification of Compton effect.
- 4** Write answers of any **two** : (seven marks each) **14**
- (1) Describe the Franck - Hertz experiment with proper diagram.
  - (2) State and explain the significance of four quantum numbers.
  - (3) Write a detailed note : Magnetic orbital quantum number.
  - (4) Write a detailed note : Electron configuration of atoms.
- 5** Write answers of any **two** : (seven marks each) **14**
- (1) What are matter waves ? Explain their physical significance.
  - (2) Explain the Davison-Germer experiment to verify the wave nature of particles.
  - (3) Describe the production of X-rays.
  - (4) Derive an expression for the Einstein Photoelectric effect.