

Roll No. ....

(a) Derive the time dependent Schrödinger wave equation. 8

(b) Write two limitations of old quantum theory. 2

**41258**

**B. Sc. (Hons.) Maths 4th Semester  
Examination – May, 2019**

**PHYSICS -IV**

Paper : BHM246 Opt - ii

**Time : Three hours / [ Maximum Marks : 60**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting at least *one* question from each Unit. Question No. I is *compulsory*.

1. (a) Write the purpose of Do statement.
- (b) Two dice are thrown simultaneously. What will be probability that either a number 2 or 4 on the upper faces of dice.
- (c) Define static and dynamic system.

(4)

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- (d) Compare the photoelectric effect and Compton effect. 7
- (e) If an electron has a wavelength, does it also have a colour.  $2 \times 5 = 10$

#### UNIT - I

2. (a) What is a flow chart? Write the rules of drawing flow chart. Give the advantage of flow chart. 6
- (b) Distinguish between executable and non-executable statements. 4

3. (a) Explain GOTO statement along with its types. 6
- (b) Write a subprogram to calculate the area of a triangle. 4

#### UNIT - II

4. (a) Derive Boltzmann distribution law and derive expression for values of A and B. 7
- (b) Find the probability that in tossing a coin 12 times, we get (i) 3 heads 9 tails (ii) 6 heads 6 tails. 3

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5. (a) Derive Planck's law of radiation using B-E distribution. 7
- (b) Define macrostate and microstate with examples. 3

#### UNIT - III

6. (a) What do you understand by wave particle dualism? Describe Davison and Germer's experiment to illustrate the wave nature of matter. 7
- (b) An electron has a speed  $1.05 \times 10^4$  m/s within the accuracy of 0.02%. Calculate the uncertainty in the position of the electron. 3

7. (a) Define group velocity, phase velocity and particle velocity. Derive a relation between group velocity and particle velocity for a relativistic particle. 7
- (b) The work function of a metal is 3.5eV. Calculate, what should be the maximum wave length of a photon that can eject photo-electrons from the metal. 3

( 3 )

P. T. O.