B.Sc 5th Semester Unit Test 2024

Paper: PHY-HC-5016

Time: 60 minutes Date: 24-09-2024 Total marks: 20

Answer the following questions: 1 x 4 = 4

1. When is a wave function said to be well-defined?
2. How many degenerate states are in a H-atom for $n = 2$? What are they?
3. The total angular momentum of an electron is …….
4. Formula for Bohr Magneton is ……

Answer the following questions: (**any three**) 2 x 3 = 6

1. What are the quantum numbers used to specify the state of an electron in an atom?
2. Write down the expression for energy of an electron in a H-atom.
3. Find the angular momentum of an electron which has an orbital angular momentum quantum no. l=7.
4. The possible number of values the magnetic quantum number m_l can take for a given orbital quantum number l is …….

Answer the following questions: (**any two**) 5 x 2 = 10

1. Obtain quantum mechanical operator form of momentum and energy.
2. Express the general solution of the time dependent Schrodinger equation in terms of linear combination of stationary states.
3. Derive the expression for degeneracy in a H-atom.
4. What do you understand by Larmor precession? Find an expression for the Larmor frequency.
5. What do you understand by space quantization? Explain by drawing a suitable diagram.

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