DR-1553
M. Sc. (Second Semester) Examination,
April-May, 2019
PHYSICS
Paper : Third
(Quantum Mechanics-II) Time Allowed : Three hours
Maximum Marks : 40

Note : Attempt questions of all two sections as directed. Distribution of marks is given with sections.

Section-A'
(Short Answer Type Questions)   5x3=15

Note : Attempt all five questions. One question from each unit is compulsory. Each question carries 3 marks. Answer should not exceed 100 words.

Unit-I

1. Explain the Vander Wall's instruction.

Or

Discuss the exchange degeneracy.

Unit-II

2. Discuss the adiabatic approximation,

Or

Is the WKB method applicable to the penetration of barrier

Unit-III

3. Discuss how collision between to identical particles is different from the collision between two nomidential particles

Or

Discuss the spin angular momentum.

Unit-IV

4. Explain the selection rules.

Or

Discuss the transition probability for absorption and emission,

Unit-V

5. Discuss the sudden approximation.

Or

What do you mean by Poynting vector?

Section-'B'
(Long Answer Type Questions) 5x5=25

Note : Attempt all the five questions. One question from each unit is compulsory. Each question carries 5 marks. Maximum word limit 800 words.

Unit-1

Derive on expression for polarizability of hydrogen.

Or

Calculate the ground state at Helium atom using by variational method.

Unit-II

7. Describe the interaction term in the a-decay of radio active nucleus.

Or

Describe the time dependent perturbation theory for the solution of Schrödingger wave equation in a potential field and discuss its validity.

Unit-III

8. Explain the collision between identical particles.

Or

Derive the spin wave function for a system of a many electrons.

Unit-IV

9. Derive the interaction term in the semi-classical theory of radiation

Or

Explain the electric dipole and forbidden transitions.

Unit-V

10. Explain the symmetric and anti-symmetric wave functions. Use the algebra of angular momentum operators to obtain the matrix representation of the various spin components of the electron.