M.Sc. DEGREE EXAMINATION,NOVEMBER 2018
I Year I Semester
Core Major -III
QUANTUM MECHANICS-I

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. State Heisenberg's uncertainty principle.
2. State Ehrenfest's theorem.
3. What do you mean by central forces?
4. Give significance of particle in a box.
5. Write a note on parity and time reversal.
6. What is the Hilbert space? Give its use.
7. State WKB quantization rule.
8. Mention uses of variation method.
9. Write down the Pauli's spin matrices.
10. What do you mean by matrix representation? Give its use.
11. Give interpretation of wave function.
12. Solve [L_x,L_y].

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Explain postulates of quantum mechanics.
14. Give brief account on barrier penetration.
15. Explain symmetries and conservation laws.
16. Write a note on connection formulae.
17. Discuss in brief about eigenvalue spectrum from angular momentum algebra.
18. Explain symmetry and anti-symmetry of wave functions.
19. Describe Ladder operator method.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Explain the following: (i) Hermitian operators for dynamical variables, and (ii) Eigenvalues and Eigenfunctions.

21. Discuss the hydrogen atom problem.

22. Describe the Schroedinger and Heisenberg Interaction pictures.

23. Explain the WKB approximation.

24. Discuss the addition of angular momenta and Clebsch-Gordan coefficients.

M.Sc. DEGREE EXAMINATION,NOVEMBER 2018
I Year I Semester
Core Major -III
QUANTUM MECHANICS-I

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. State Heisenberg's uncertainty principle.
2. State Ehrenfest's theorem.
3. What do you mean by central forces?
4. Give significance of particle in a box.
5. Write a note on parity and time reversal.
6. What is the Hilbert space? Give its use.
7. State WKB quantization rule.
8. Mention uses of variation method.
9. Write down the Pauli's spin matrices.
10. What do you mean by matrix representation? Give its use.
11. Give interpretation of wave function.
12. Solve [L_x,L_y].

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Explain postulates of quantum mechanics.
14. Give brief account on barrier penetration.
15. Explain symmetries and conservation laws.
16. Write a note on connection formulae.
17. Discuss in brief about eigenvalue spectrum from angular momentum algebra.
18. Explain symmetry and anti-symmetry of wave functions.
19. Describe Ladder operator method.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Explain the following: (i) Hermitian operators for dynamical variables, and (ii) Eigenvalues and Eigenfunctions.

21. Discuss the hydrogen atom problem.

22. Describe the Schroedinger and Heisenberg Interaction pictures.

23. Explain the WKB approximation.

24. Discuss the addition of angular momenta and Clebsch-Gordan coefficients.