

**M.Sc. DEGREE EXAMINATION, EVEN SEMESTER 2021**  
**I Year I Semester**  
**Quantum Mechanics-I**

**Max.marks :25**

Answer any **FIVE** questions ( $5 \times 5 = 25$ ) Marks

1. State Ehrenfest's theorem and uncertainty principle. Give examples for eigen values and eigen function.
2. What is reduced mass of a two body system? How do you find the probability of a particle in a box?
3. Give examples for interaction picture. What operator is the "generator" for translation. State the condition for a quantum system to be symmetric.
4. Consider a particle of mass 'm' in the potential  $V(x) = a|x|$ , where  $a > 0$ . Calculate the energy eigen values  $E_n$  ( $n = 0, 1, 2, \dots$ ) in WKB approximation.
5. What are Clebsch Gordan coefficient? Why do we use them?
6. Show that any two of Pauli's spin matrices in quantum mechanics anticommute,  $AB = -BA$
7. How do you tell if a particle is in a stationary state? Are electrons stationary in the stationary state?