M.PHIL DEGREE EXAMINATION,FEBRUARY 2019
ADVANCED TOPICS IN PHYSICS

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

Section A $(5 \times 15 = 75)$ Marks

Answer any **FIVE** questions

1. Derive an expression for the Schrodinger wave equation? Explain Heisenberg interaction pictures.
2. Obtain an expression for Klein-Gordon equation for a charged particle moving in an electromagnetic field. And show that this equation reduces to the schrodinger equation of motion for the particle in an electromagnetic field in the non - relativistic limit.
3. Explain negative energy states in electromagnetic field.
4. Define orbital angular momentum, and obtain the addition of two angular momenta.
5. Deduce the symmetry elements and symmetry operation by matrices.
6. (a) Distinguish between reducible and irreducible representation.

   (b) Write a note on normal modes of various symmetry types.
7. Describe briefly the rotational and Vibrational Raman spectra of diatomic molecules.
8. Discuss in detail about the lasers.

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