Roll No. ..... **Total No. of Pages : 2**

PC 11473-NH

CS/2111
PHYSICAL CHEMISTRY-III
Semester–V

Time Allowed : Three Hours] [Maximum Marks : 26

Note :- Candidates are required to attempt *two* questions (4 marks each question) each from Sections A and B. Section C is compulsory (2 marks each question).

SECTION—A

1. Derive Planck's radiation law.
2. Discuss Schrodinger wave equation and its importance.
3. Discuss quantum numbers and their importance.
4. Differentiate between radial and angular wave functions.

SECTION—B

5. Explain Born-Oppenheimer approximation and its utility. When does this approximation break down ?
6. Distinguish between rigid and non rigid rotor. Derive relation for energy level evaluation for non-rigid rotor.
7. Discuss effect of anharmonic motion and isotope on vibration spectra.
8. Rotational intensities of transitions occurring in a molecule are different. Comment.

SECTION—C

9. (a) Write expression for Hamiltonian operator. For which physical quantity it is used ?

   (b) What is the physical significance of quantum numbers ?

   (c) Write a note on sinusoidal wave equation.

   (d) Write and explain importance of selection rules for rotational spectra for diatomic molecules.

   (e) Discuss applications of pure rotational spectra.