

Paper IV – OPTICS AND SPECTROSCOPY

(For those who joined in July 2003 and after)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

All questions carry equal marks.

1. (a) Give the theory of multiple beam interference.

Or

(b) State and explain the Poynting vector.

2. (a) Obtain an expression for the Fresnel-Kirchoff's integral formula.

Or

(b) Describe the construction and working of Helium-Neon laser and Ruby laser.

3. (a) Give the theory of rigid diatomic molecules and discuss the non-rigid rotator.

Or

(b) Describe the Classical and Quantum theory of Raman effect.

4. (a) State and explain the Frank-Codon principle and dissociation energy.

Or

(b) Describe the theory of the Zeeman effect.

5. (a) Explain with a block diagram of NMR spectrometer and relaxation process.

Or

(b) Outline briefly quadrupole interaction and magnetic hyperline interaction in Mössbauer spectroscopy.