Roll No. .....

(12/24)

15423

M. Sc. EXAMINATION

(For Batch 2021 & Onwards)

(Third Semester)

PHYSICS

MSc/Phy/3/SEC1-A

Laser and Spectroscopy–I

Time : Three Hours *Maximum Marks :* 70

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory.

1. (i) What is pumping process ?

   (ii) Explain transmission losses in optical resonators.

   (iii) What is physical significance of Einstein coefficients relation ?

(iv) What is principle of FTIR Spectrophotometer ?

(v) Define stimulated emission. 5×2=10

Unit I

2. Define the following : 3×5=15

(a) Active Medium

(b) Coherence

(c) Monocromaticity.

Or

What are the resonant modes of laser cavity ? Explain the types of resonant cavities. 15

Unit II

3. Explain optical resonator in laser system. Define energy stored in optical resonator with an example. 15

Or

What is a Gaussian laser beam and its properties ? Describe the advantages of Gaussian beam. 15

Unit III

4. What do you mean by broadening of spectral lines ? What are homogeneous and inhomogeneous broadening mechanisms ? 15

Or

Explain the principle of Laser Amplification and laser Oscillations. 15

Unit IV

5. Define Raman spectroscopy and its advantages. 15

Or

Explain Charge-Coupled Devices with their working principles and its applications.