Roll No. .....

22025

M. Sc. Physics (CS) 2nd Semester Examination – May, 2019

PHYSICS OF LASER AND LASER APPLICATIONS

Paper : Phy(s) – 205

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting at least ***one*** question from each Unit. Question No. **1** is ***compulsory***.

1. (a) What is superfluorescence ? $4 \times 4 = 16$

(b) Define Pumping efficiency.

(c) What is a dye laser ?

(d) What is Raman scattering ?

P. T. O.

UNIT – I

2. (a) Discuss spontaneous and stimulated emission. Discuss relation between Einstein coefficients. 12

(b) The ratio of population of two energy levels out of which upper one corresponds to metastable state is 1.059×10^{-30}. Calculate wavelength of light emitted at 300 K. 4

3. Explain the concept of directionality, monochromativity, brightness and coherence as applied to lasers. 16

UNIT – II

4. Explain three level laser system and derive it's threshold pumping power per unit volume required to maintain population inversion. 16

5. (a) What is Q. switching ? Discuss methods of Q. switching. 8

(b) Explain mode locking. 8

UNIT – III

6. Explain construction, working and energy level diagram of N_2 laser. Give its applications. 16

7. Explain the construction and working of a Nd- laser. Calculate the threshold pump power for laser.

UNIT – IV

8. Explain :

(a) Multiphoton process

(b) Stimulated Raman effect.

9. What is Holography ? How a hologram is made how is it reconstructed ? Write applications Holography.
