

9. Write notes on :

(i) Raman & Rayleigh scattering.

8

(ii) Thermonuclear fusion.

8

Roll No.

76617

**M.Sc. Physics 3rd Semester (New)
w.e.f. December, 2013
Examination-December, 2015**

Physics of Lasers and Laser Application

Paper : XII(EL-1)

Time : 3 hours

Max. 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 the examination.

Note : Attempt five questions in all, selecting one from each unit. Question No. 1 is compulsory.

1. Discuss the following :

- | | |
|-----------------------------|---|
| (a) Lasers and Masers. | 4 |
| (b) Pumping Schemes. | 4 |
| (c) Optical Communications. | 4 |
| (d) Self Focussing. | 4 |

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76617-1250-(P-4)(Q-9)(15) (4)

UNIT - I

2. (a) Derive relation between Einstein Coefficients. 8
- (b) Discuss the properties of laser beams by illustrating with proper diagrams. 8
3. (a) How Monochromicity and coherence are related ? Discuss. 8
- (b) Calculate the relative rate of spontaneous and stimulated process in the frequency ($\nu = 10^{10}$ Hz) at 300k. 8

UNIT - II

4. Discuss four level laser in detail and show how is it superior to three level laser. 16
5. (a) Discuss various methods of Q switching. 8
- (b) Discuss the theory of mode locking. 8

UNIT - III

6. Discuss constructing working showing energy level diagram for a tunable laser. Give its applications. 16
7. Describe construction and working of Ruby laser. Calculate its pumping power. 16

UNIT - IV

8. (a) Derive the theory of two photon process and illustrate an experiment to show it. 8
- (b) Differentiate normal photoelectric effect and multi-photon photoelectric effect. 8