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Total Pages : 3

238303

December, 2019

M.Sc. (Physics) III SEMESTER

Laser Technology (PHL-303)

Time : 3 Hours]

[Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART - A

1. (a) Define amplification of light in Laser? [CO-1] (1.5)

(b) Explain the type of coherence. [CO-1] (1.5)

(c) What are the requirements for lasing action? [CO-1] (1.5)

(d) Explain non-linear susceptibility. [CO-3] (1.5)

(e) Why population inversion plays important role in Lasing action? [CO-1] (1.5)

(f) Explain collision in dye laser with its states. [CO-2] (1.5)

(g) Differentiate between Hetro and Homo Junction Laser. [CO-2] (1.5)

(h) Explain optical molasses in laser cooling system. [CO-4] (1.5)

(i) Explain *two* photon process. [CO-3] (1.5)

(j) Describe Laser-cooled Bose-Einstein condensate. [CO-4] (1.5)

PART - B

2. (a) Explain pumping process. Why is the lasing action not possible in two level atomic system. Prove $N_1=N_2=N_0/2$? [CO-1] (10)

(b) What are the properties of Laser Beam? [CO-1] (5)

3. (a) What are the conditions for Free Electron Lasers? [CO-2] (5)

(b) Define self-focusing and explain the expression for the self-focusing. [CO-3] (10)

4. Explain the construction and working of CO_2 laser by schematic and energy level diagram respectively. [CO-2] (15)

5. (a) Differentiate between the Photoelectric effect and Multiquantum Photoelectric effect. [CO-3] (5)

(b) Explain Magneto-Optical Traps with diagram. [CO-4] (10)

6. (a) Define resonator and Q-Switching. [CO-1] (5)

(b) Elaborate optical pumping in laser cooling through energy level diagram. [CO-4] (10)

7. Discuss Raman Scattering Effects, which arises from non-linear interaction of a system with intense monochromatic radiation. [CO-3] (15)
