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211102

M. Sc. (Fourth Semester) Examination, June 2021

PHYSICS

Paper : Second

(Laser Physics)

Maximum Marks : 42

Note: *Attempt questions of all three sections as directed. Distribution of marks is given with sections.*

Section-A

(Objective Type Questions) **7×1=7**

Note: *Attempt all the questions. Each question carries 1 mark.*

1. Choose the correct answer :

(i) Stimulated emission is also called :

(a) Self emission

(b) Absorption

(c) Inverted absorption

(d) None of these

(ii) Laser beam is not :

(a) Monochromate

(b) Coherent

(c) Non-coherent

(d) None of these

(iii) Solid laser is :

(a) He–Ne

(b) Ruby

(c) Ga As

(d) None of these

(iv) In He–Ne laser pumping process is :

(a) Optical pumping

(b) Inelastic atomic collision

(c) Electric pumping

(d) None of these

(v) The wave length of Ruby laser is :

(a) 6328 Å

(b) 5000 Å

(c) 6943 Å

(d) 8000 Å

(vi) The light source used in Holography :

(a) Multichromatic only

(b) Monochromatic only

(c) Coherent only

(d) None of these

(vii) Pulse laser is :

(a) Ruby Laser

(b) He–Ne

(c) Chemical

(d) Semi conductor

Section-B

(Short Answer Type Questions) **5×2=10**

Note: *Attempt all **five** questions. **One** question from each unit is compulsory. Each question carries 2 marks.*

Unit-I

2. Explain stimulated emission.

Or

Explain Einstein coefficient.

Unit-II

3. What is Open Resonator?

Or

Discuss vibrational mode of resonators.

Unit-III

4. Explain principle of semi conductor.

Or

Explain Dye laser.

Unit-IV

5. Describe laser cutting.

Or

Write some application & uses in Medicine.

Unit-V

6. What do you know about non linear optics?

Or

Explain Optical Mixing.

Section-C

(Long Answer Type Questions) **5×5=25**

Note: *Attempt all **five** questions. **One** question from each unit is compulsory. Each question carries 5 marks.*

Unit-I

7. Define Laser & its basic requirement.

Or

Explain laser pumping scheme for two and three level system.

Unit-II

8. What are Resonator? Explain open resonator in detail.

Or

What are temporal coherence of light waves and spatial coherence with help of diagram.

Unit-III

9. Explain Gas Laser in detail.

Or

Explain Solid State Laser.

Unit-IV

10. Characteristics of Holographs.

Or

Describe the method of making hologram and reconstricting the hologram image.

Unit-V

11. Explain any **two** of the following :

(i) Optical mixing

(ii) Parametic generation of light

(iii) Idea about non linear optics

(iv) Second harmonic generation