

(202PHY17)

M.Sc. DEGREE EXAMINATION, APRIL 2018

SECOND SEMESTER

Branch - Physics

ELECTROMAGNETIC THEORY, LASERS AND MODERN OPTICS

(New syllabus for batch 2017)

Time : 3 Hours

Max. Marks : 70

PART - A

(Short Answer Type)

Answer any FOUR questions.

(Marks : 4×5 marks = 20 marks)

1. State and explain skin depth.
2. Write about linear antenna.
3. Explain Spontaneous and Stimulated emission.
4. Explain Phase matching condition.
5. Write about briefly speckle pattern.
6. What is apodization?
7. Discuss total internal reflection in graded index optical fiber.
8. What are the applications of optical fiber in medicine?

PART - B

Answer ALL questions. All questions carry equal marks.

(Marks : $4 \times 12\frac{1}{2}$ marks = 50 marks)

9. (a) Explain about electromagnetic radiation and deduce Wiechert potentials. Discuss radiation from moving point charge.

Or

- (b) State and prove the boundary conditions at the plane of separation between two dielectric media.
10. (a) Explain the principle, construction and working of Ruby laser.

Or

- (b) Explain about harmonic generation, second and third harmonic generations.

[P.T.O]

11. (a) Explain the principle and working of holography and write down the application of holography.

Or

- (b) Explain about Fraunhofer diffraction of double slit. State and derive the Parseval's formula.
12. (a) Explain the types of optical fibers along with their structure, dimensions with a diagram of propagation of wave. Further discuss about their applications.

Or

- (b) State and explain attenuation with units. Explain how signal distortion takes place in optical fibers.
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