121216468028

Code No. 7107 / E

FACULTY OF SCIENCE

B.Sc. IV-Semester (CBCS) Examination, May / June 2018

Subject : Physics

Paper - IV : Optics

Time : 3 Hours **Max. Marks: 80**

SECTION – A (5 x 4 = 20 Marks)
(Short Answer Type)

Note : Answer any FIVE of the following questions.

1 Define the principles of Superposition and explain it.
2 Mention the difference between Biprism and Lloyd's Mirror Fringes.
3 What are Fresnel's assumption used to explain diffraction?
4 Explain Rayleigh criterion for resolution.
5 What is Polarizing angle? Does it depend upon the wavelength of light? Explain.
6 State and explain Malus Law.
7 What is Coma?
8 What are various types of losses in the optical fibers?

SECTION – B (4 x 15 = 60 Marks)
(Essay Answer Type)

Note: Answer all questions from the following.

9 (a) What are Newton's Rings? Show that the diameter of Newton's dark rings are proportional to the square root of natural numbers.

OR

(b) Describe Michelson's interferometer. How it is used to determine the thickness of thin sheet?

10 (a) Derive an expression for radius of a Fresnel half period zone.
Find the angular width of a central bright maximum in the Fraunhofer diffraction pattern of slit of width 12×10^{-5} cm when the slit is illuminated by monochromatic light of wave length 6000° A.

OR

(b) Explain the phenomenon of Fresnel diffraction at straight edge. Indicate the intensity distribution of diffraction pattern by a diagram.

11 (a) Describe the construction and working of Nicol prism.

OR

(b) Describe the polarimeter and explain how it is used to measured the strength of sugar solution.
A tube 20 cm long containing sugar solution rotates the plane of polarization through an angle 13.5°. If the specific rotation is 66°. Find the amount of sugar present in a litre of solution.

12 (a) Explain the defects of images due to astigmatism and curvature. Discuss the methods for eliminating them.

OR

(b) Explain the differences between step index and graded index fibers. Obtain an expression for numerical aperture.

*****