

92233

B.Sc. 4th Semester (Hons.) (New Scheme)

Examination, May-2016

PHYSICS

Paper-Phy-403

Vibration and Wave Optics-II

Time allowed : 3 hours] [Maximum marks : 40

Note : Attempt five questions in all, selecting at least two question from each unit.

Unit-I

1. (a) Discuss Fraunhofer diffraction pattern due to a single slit. How can you utilize it to determine the wavelength of light. 5
- (b) In Fraunhofer diffraction due to a narrow slit a screen is placed 2m away from the lens to obtain the pattern. If the slit width is 0.2 mm and the first minima lie 5 mm on either side of the central maxima, find wavelength of light. 3
2. Describe analytically the intensity distribution in diffraction due to double slit. Also explain the missing orders in double slit diffraction pattern. 8
3. Explain the use of Fresnel-Kirchoff Integral theorem to solve any one diffraction problems. 8

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4. (a) Describe the theory of plane transmission grating. 5
- (b) A grating is ruled over a width of 0.1 m and the number of lines on the grating is 5000 lines per cm. Find the smallest wavelength difference that could be resolved in the region of 5000\AA in the first order. 3

Unit-II

5. Describe and explain the phenomenon of Fresnel diffraction due to a straight edge. Explain why the bands are neither equidistant nor equally illuminated. 8
6. Explain Cornu's spiral and Fresnel Integrals. 8
7. Discuss the properties of Cornu's spiral and explain its relationship with Fresnel's half period zones. Show how the spiral can be used to obtain the intensity distribution in the Fresnel diffraction pattern due to a straight wire. 8
8. What is holography? Describe its theory as interference between two plane waves. 8