Tutorial 4: Polarization & Diffraction

Optics: Diffraction

Q1. What is diffraction of light? (1 mark)

Q2. Describe the intensity distribution associated with the single slit diffraction pattern. (3 marks)

Q3. Describe the diffraction by circular aperture. Also describe the limit of resolution. (3 marks)

Q4. A viewing screen is separated from a double-slit source by 1.2 m The distance between the two slits is 0.030 mm. The second-order bright fringe (m=2) is 4.5 cm from the center line. Then the wavelength of light is _____ nm. The distance between adjacent bright fringes is _____cm. (3 marks)

Q5. In Young's double hole experiment, two wavelengths $\lambda 1$ = 780 nm and $\lambda 2$ = 520 nm are used to obtain interference fringes. If the nth bright fringe due to $\lambda 1$ coincides with $(n+1)th$ bright fringe due to $\lambda 2$, then the value of n is __. (3 marks)

Reference:

Optics by Ajoy Ghatak, 6E
Chapter 18, Fraunhofer Diffraction I (Page 18.3)
18.1 Introduction
18.2 Single-slit Diffraction Pattern
18.3 Diffraction by Circular Aperture

Optics: Polarization

Q1) Explain unpolarized and polarized light. (3 marks)

Q2) What is polarization of light? Explain linear, elliptical and circular states of polarization. (3 marks)

Q3) Describe Malus' law, with diagram and mathematical expression. (3 marks)

Q4) Describe following methods to get polarized light. (6 marks)

I. Polarizer and the Polaroid
II. Polarization by Reflection
III. Polarization by Double Refraction
IV. Polarization by Scattering

Reference:

Optics by Ajoy Ghatak, 6E
Chapter 22, Polarization and Double Refraction (Page 22.3)
22.1 Introduction
22.2 Malus' law
22.3 Production of polarized light