Assignment:

Q.1. Unpolarised light falls on two polarising sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the transmitted light is one third intensity of the incident beam?

Q.2. light of $\lambda = 6000\,\text{Å}$ is incident on a narrow slit. The screen is placed 2m away from the slit. Find (a) the position of the first dark fringe (b) the width of the central bright fringe.

Q.3. What is the radius of the first half-period zone plate behaving like a convex lens of focal length 60cm for light of wavelength 6000Å?

Q.4. In an experiment for determining the refractive index of a gas using Michelson interferometer a shift of 140 fringes is observed, when all the gas is removed from the tube. If the wavelength of light used is 5460 Å and the length of the tube is 20cm, calculate the refractive index of the gas.

Q.5. In a Newton's rings experiment the diameter of 10^{th} ring changes from 1.40 to 1.27cm when a drop of liquid is introduced between the lens and the glass plate. Calculate the refractive index of the liquid.

Q.6. When a thin sheet of transparent material of thickness 6.3×10^{-4} cm is introduced in the path of one of the interfering beams, the central fringe shifts to a position occupied by the sixth fringe. If $\lambda = 5460\ \text{Å}$, find the refracting index of the sheet.

Ans Q.7. In Lloyd's single mirror interference experiment, the slit source is at a distance of 2mm from the plane of the mirror. The screen is kept at a distance of 1.5m from the source. Calculate the fringe width, $\lambda = 5890\ \text{Å}$.

Q.8. Each slit of a double slit has width = 0.15mm and the distance between their centers is 0.75mm. Find the missing orders in the diffraction pattern.

Q.9. Two vibrations along the same line are described by $x(1) = 0.05 \cos 8\pi t$
$x(2) = 0.03 \cos 10\pi t$,
x(meters) t(seconds). Find the beat period.

Q.10. A beam of monochromatic light of wavelength 5.82×10^{-7} m falls normally on a glass wedge with the wedge angle of 20'. If the refractive index of glass is 1.5, find the number of dark fringes per cm of the wedge length.