EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE - 2003/2004

(NOV/DEC 2004)

PH 102 PHYSICAL OPTICS I

FIRST SEMESTER

Time: 01 hour.

Answer ALL Questions

1. What are monochromatic waves?

What are the conditions necessary to observe the interfering fringes in a Young's double slit experiment? Draw a suitable diagram with usual notations to illustrate the Young's double slit experiment and derive an equation for the phase difference of the interfering beams.

State the conditions for obtaining bright and dark fringes and deduce the equation to find the fringe width β.

Two straight and narrow parallel slits 3mm apart are illuminated by a monochromatic light of wave length of $5900A^0$. Fringes are obtained on a 0.6m distanced screen from the slits. Find the value of the fringe width.

2. Briefly explain the difference between the fringes of equal thickness and fringes of equal inclination.

Draw an experimental arrangement to observe the fringes of equal thickness. Derive an equation for the phase difference of the interfering beams formed in a thin transparent film of varying thickness and having refractive index μ.

A parallel beam of monochromatic light of wavelength 5460 A^0 falls at the angle of incident of 30^0 on the surface of a very thin wedge of glass. The straight parallel interfering fringes were observed and it was found that the distance between successive bright fringes is exactly 1mm. Calculate the angle of wedge which has the refractive index $\mu = 1.5$.