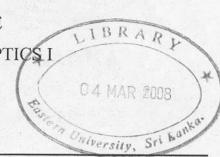EASTERN UNIVERSITY, SRI LANKA

FIRST EXAMINATION IN SCIENCE 2003/04 (OCT-DEC. 2006)

FIRST SEMESTER

EXTERNAL DEGREE

EXTPH 102 - PHYSICAL OPTICS I

Time: 01 hours.

Answer ALL Questions.

01. 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 3 mm apart are illuminated by a monochromatic light of wave length of 5900A^0. Fringes are obtained on a 0.6 m distanced screen from the slits. Find the value of the fringe width.

02. Explain what is meant by "fringes of equal thickness" and "fringes of equal inclination".

An equi-convex lens is placed on a flat plate in a Newton's ring arrangement. The refractive index of the glass is 1.5 and the focal length of the lens is 1 m. The wave length of the light used is 589 nm.

(i) Draw a simple diagram to show how a single beam is divided to produce interfering pattern in Newton's ring arrangement.

(ii) Find the order of the bright ring of radius 20 nm.

(iii) How many bright rings would be produced if the water of refractive index 1.33 is between the lens and the flat plate?