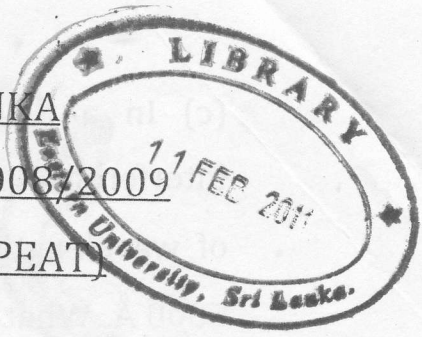# EASTERN UNIVERSITY, SRI LANKA
FIRST EXAMINATION IN SCIENCE - 2008/2009
SECOND SEMESTER (PROPER/REPEAT)
(October/November 2010)
PH 102 PHYSICAL OPTICS I

Time: 01 hour.

Answer **ALL** Questions

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1. When two monochromatic and coherent light beams having intensities I_1 and I_2 are superimposed, the intensity variation across the observed fringe pattern is given by:

$$I = I_1 + I_2 + 2\sqrt{I_1 I_2} \cos \delta$$

Where δ is the phase difference between the two beams at the observation plane.

(a) Give a quantitative plot for the variation of intensity against δ.

(b) Show that in a Young's double slit experiment (assume that the two slits are identical):

$$I = 4I_o \cos^2\left(\frac{\pi x d}{\lambda D}\right)$$

where the symbols have their usual meaning and d is the slit separation, D is the distance between the slits and the screen and x is the distance to any given fringe from the central fringe.