

EASTERN UNIVERSITY, SRI LANKA
SECOND EXAMINATION IN SCIENCE 2002/03 (OCT-DEC. 2006)

FIRST SEMESTER
EXTERNAL DEGREE
EXTPH 203 – PHYSICAL OPTICS II



Time: 01 hours.

Answer ALL Questions.

01. What is meant by diffraction of light? Distinguish Fraunhofer diffraction from Fresnel diffraction. Give Huygen's principle.

A single slit with slit width b is illuminated by a light of wave length λ produces an intensity pattern on a screen that is placed in front of a slit at a distance L . The intensity on the screen produced by a slit is given by

$$I = A_0^2 \frac{\sin^2 \beta}{\beta^2}$$

where the symbols have their usual meanings.

- (i) Find the maximum and minimum intensity of the pattern.
(ii) Find the β values for the principal maxima and the secondary maximas and draw the appropriate intensity pattern for the single slit diffraction.
02. What do you understand by the resolving power of an optical instrument? What is the Rayleigh's criterion for just resolved position in an optical telescope?

Write down the equation for resolving power of telescope and identify its symbols.

Considering only diffraction, what is the maximum distance at which the human eye can distinguish the two headlights on an automobile? The headlights are separated by 1.60 m, the pupil of the eye is 5.0 mm in diameter, and the wave length of the light is 500 nm. At what distance can the headlights be distinguished if the wavelength is increased to 650 nm?