PHYS206: General Physics IV KOÇ UNIVERSITY Spring Semester 2013

College of Arts and Sciences

Section 1a Quiz 4 8 March 2013

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

Name: Student ID: Signature:

Two slits spaced 0.260 mm apart are placed 0.700 m from a screen and illuminated by coherent light with a wavelength of 660 nm. The intensity at the center of the central maximum ($\theta=0^0$) is I_0.

a) What is the distance on the screen from the center of the central maximum to the first minimum?

b) What is the distance on the screen from the center of the central maximum to the point where the intensity has fallen to $I_0/2$?

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Section 1b Quiz 4 8 March 2013

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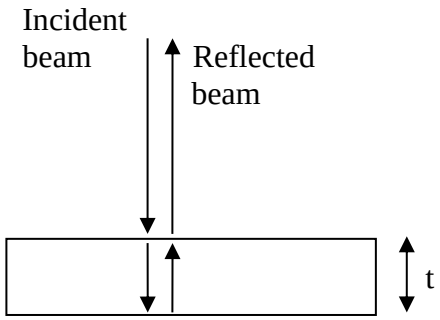
Quiz duration: 10 minutes

Name: Student ID: Signature:

In the following figure there is a slab of glass with refractive index n and thickness t. A plane wave of wavelength λ, impinges perpendicularly on the surface. How much thickness the slab should have if we want to have destructive interference between the reflected beams from first and second interfaces? Write an expression as a function of λ and m where m is an integer.



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Section 1c Quiz 4 8 March 2013

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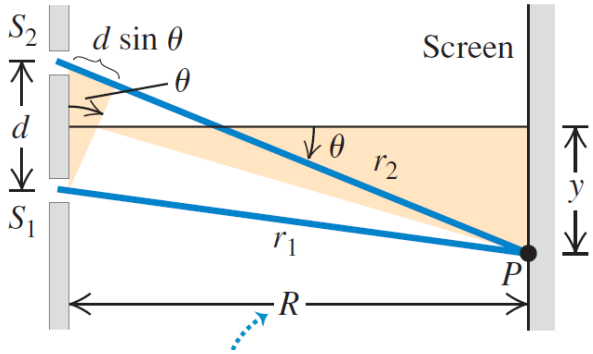
Quiz duration: 10 minutes

Name: Student ID: Signature:

In the following figure a plane wave comes from the left and after passing through two slits S_1 and S_2 makes interference pattern on the screen with distance R from the slits. Assuming that R is much larger than d (distance between the centers of two slits) write down the expressions that give the vertical position of bright and dark spots on the screen in terms of wavelength of light λ, R, d, and the number of fringe m from the central fringe.



PHYS 206: **KOÇ UNIVERSITY** **Spring Semester 2013**

College of Arts and Sciences

Section 1d **Quiz 4** **8 March 2013**

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Quiz duration: 10 minutes

Name: **Student ID:** **Signature:**

A uniform thin film of material of refractive index 1.40 coats a glass plate of refractive index 1.55. This thin film has the proper thickness to cancel normally incident light of wavelength 525 nm that strikes the film surface from air, but it is somewhat greater than the minimum thickness to achieve this cancellation. As time goes by, the film wears away at a steady rate of 4.20 nm per year. What is the minimum number of years before the reflected light of this wavelength is now enhanced instead of cancelled?

PHYS 206: **KOÇ UNIVERSITY** **Spring Semester 2013**

College of Arts and Sciences

Section 1e **Quiz 4** **8 March 2013**

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Quiz duration: 10 minutes

Name: **Student ID:** **Signature:**

What is the thinnest film of a coating with $n_{coating}$=1.42 on glass with refractive index n_{glass}=1.52 for which destructive interference of the red component (650 nm) of an incident white light beam in air can take place by reflection?

PHYS 206: **KOÇ UNIVERSITY** **Spring Semester 2013**

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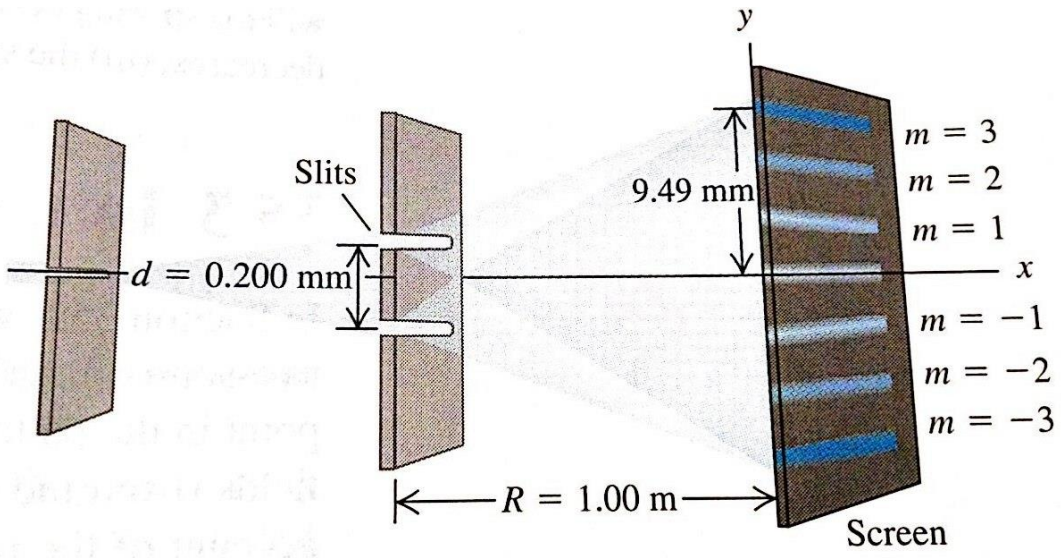
Section 1f **Quiz 4** **8 March 2013**

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

Name: **Student ID:** **Signature:**



In a two-slit interference experiment, the slits are 0.200 mm apart, and the screen is at a distance of 1.00 m. The third bright (not counting the central bright fringe straight ahead from the slits) is found to be displaced 9.49 mm from the central fringe (Figure). Find the wavelength of the light used?