

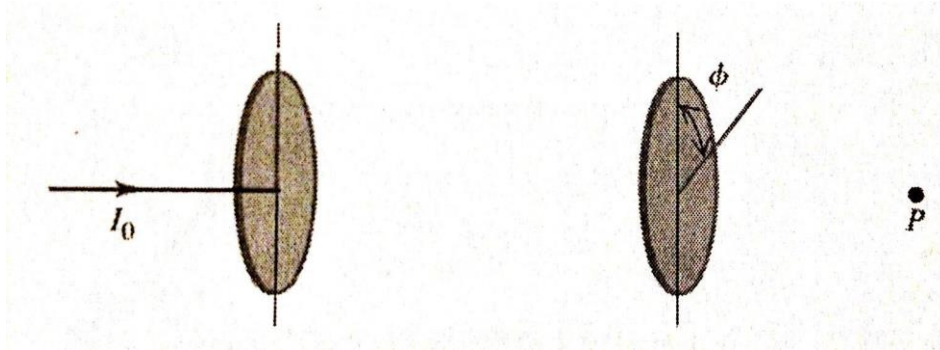
Closed book. No calculators are to be used for this quiz.

Quiz duration: 10 minutes

Name:

Student ID:

Signature:



Light of original intensity I_0 passes through two ideal polarizing filters having their polarizing axes oriented as shown in Figure. You want to adjust the angle ϕ so that the intensity at point P is equal to $I_0/9$. If the original light is linearly polarized in the same direction as the polarizing axis of the first polarizer the light reaches, what should ϕ be?

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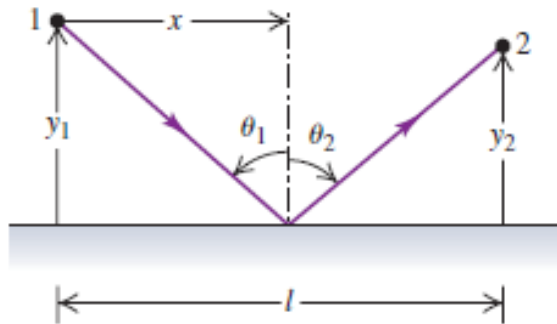
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In the following figure a beam of light goes from point 1 to point 2. Show that the angle of incidence (θ_1) is equal to the angle of reflection (θ_2) using Fermat's principle of least time.



PHYS 206:

KOÇ UNIVERSITY
College of Arts and Sciences

Spring Semester 2013

Section 1i

Quiz 1

15 Feb 2013

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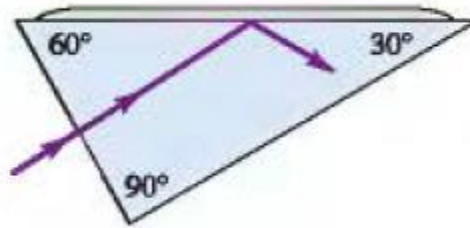
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In the following figure, light is incident normally to the smaller face of a prism. The refractive index of the prism is 1.62 .

- (a) Is the light totally internally reflected from the hypotenuse of prism if the medium above the hypotenuse is air?
- (b) A drop of liquid is placed on the hypotenuse of the prism. Find the maximum value of refractive index that liquid may have if the light is to undergo total internal reflection.



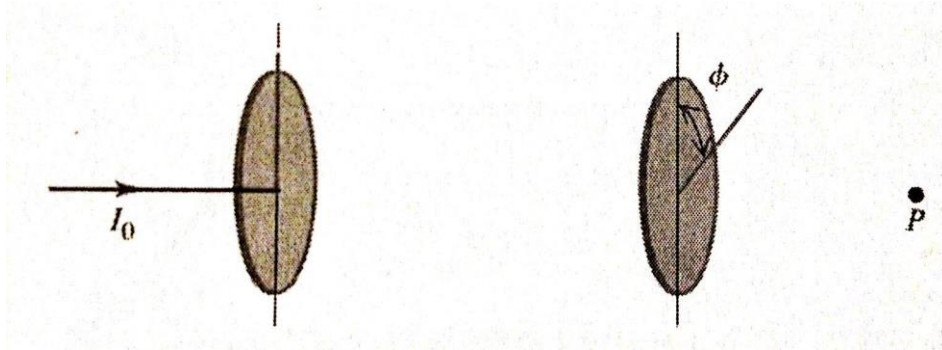
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Light of original intensity I_0 passes through two ideal polarizing filters having their polarizing axes oriented as shown in Figure. You want to adjust the angle ϕ so that the intensity at point P is equal to $I_0/4$. If the original light is unpolarized, what should ϕ be?

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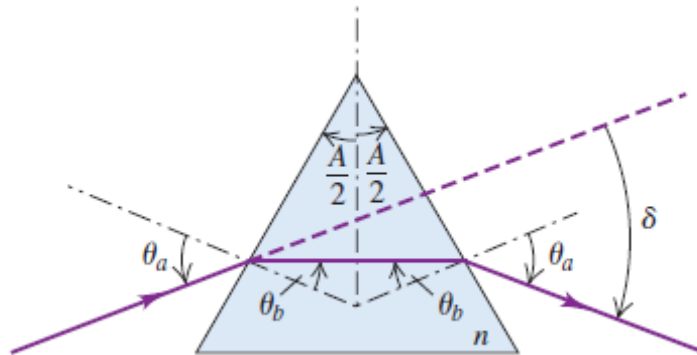
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The angle of deflection for a prism in symmetric transmission of light is

$$\sin \frac{A + \delta}{2} = n \sin \frac{A}{2}$$

The index of refraction for red and violet light is 1.61 and 1.66, respectively, and $A=30^\circ$. Find the angle between these two colors when they come out from right side of the prism shown below.



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- a) What is Brewster angle? Write down a brief explanation with your own words.
- b) Consider two cases: (i) The refractive index of medium a is greater than the refractive index of medium b ($n_a > n_b$). (ii) The refractive index of medium a is smaller than the refractive index of medium b ($n_a < n_b$). If the light travels from medium a to medium b , in which cases (I or ii) can total internal reflection be observed and in which will there be a well-defined Brewster angle?