

## Physics 112

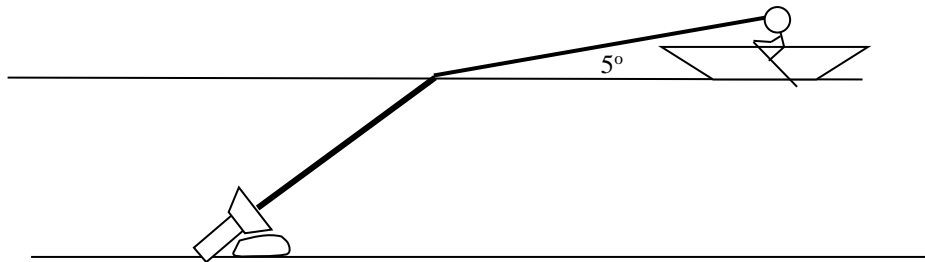
### Light Refraction Assignment

Due : Friday, November 17<sup>th</sup>, 2017

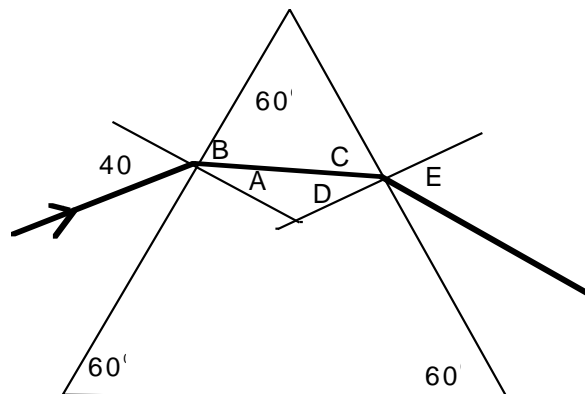
Sketch the path followed by the ray of light and calculate the appropriate angle(s)

#### Option A

1. Determine the path followed by a ray of light going from water into air, at an incident angle of  $32^\circ$ .
2. Determine the path of a ray of light going from air into crown glass and then into water. The angle of incidence in the air was  $30^\circ$ .
3. As light goes from an unknown medium into water the angle of incidence was found to be  $25^\circ$  and the angle of refraction was found to be  $50^\circ$ . What is the unknown medium?
4. Determine the critical angle for light passing from diamond into water.
5. Hannah's friend, who shall remain nameless but not blameless, lost her new waterproof LED flashlight when he was out canoeing across a lake. The light is still on at the bottom of the lake and Hannah is on a mission to find it. As she paddles slowly across the lake she barely sees a light shining out of the water. Obviously she wouldn't find it if it is laying on the bottom of the lake so based on the diagram determine the angle of the flashlight with the bottom of the lake.



6. A ray of light is incident on an equilateral crown glass triangular prism at an angle of incidence of  $40^\circ$ . Calculate the path of the light as it enters, passes through and exits the prism.



#### Option B:

Do this question only. A) Based on question 5 determine how deep the lake is if Hannah is 7.5m away from the flashlight when she sees it. Hannah's eyes are 1.2m above the water level. B) What is the smallest angle that the flashlight can make with the bottom of the lake and still have light coming out of the water?

**\*\*\*Practice Problems\*\*\***

7. Calculate the path of a ray of light that goes from crown glass into air when the angle of refraction was  $55^\circ$ . ( $32.61^\circ$ )
8. Determine the path of a ray of light as it goes from air through a flint glass plate and back into air at an incident angle of  $40^\circ$ . ( $22.93^\circ$ ,  $40^\circ$ )
9. Determine the path of a ray of light from air into diamond when the angle of incidence was  $60^\circ$ . ( $20.97^\circ$ )
10. Determine the critical angle for light going from water to air. ( $48.61^\circ$ )