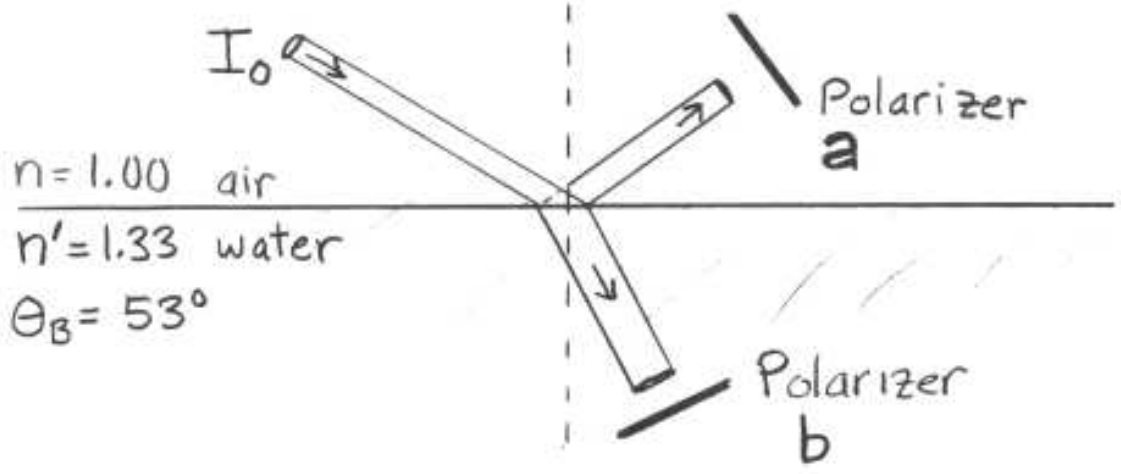
NAME_____

2. A beam of unpolarized sunlight, of intensity I_0, is incident at an angle of $\phi \approx 50°$ on a smooth surface between air and water, as shown below; Brewster's angle for this situation is $\theta_B = 53°$.



Polarizer **a** is in the path of the **reflected beam**, and polarizer **b** is in the path of the **refracted beam**. The transmission axis of each polarizer can be rotated about the direction of the respective light beam.

For the following questions, choose only one answer: 0 pts if no answer picked, +5 points if one correct answer picked; -2 points if one incorrect answer picked, -5 points if more than one answer picked.

Consider the light intensity transmitted through polarizer **a**, for two different rotations of the transmission axis of **a**. When the transmission axis is **in** the plane of the light beams, refer to the transmitted light intensity as $A_{\|}$; when the transmission axis is **perpendicular to** the plane of the light beams, refer to the transmitted light intensity as $A_{\perp}$.

(a) $A_{\|} = A_{\perp}$

(b) $A_{\|} > A_{\perp}$

(c) $A_{\|} < A_{\perp}$

(d) Need more information to evaluate the relative magnitude of $A_{\|}$ and $A_{\perp}$.

Consider the light intensity transmitted through polarizer **b**, for two different rotations of the transmission axis of **b**. When the transmission axis is **in** the plane of the light beams, refer to the transmitted light intensity as $B_{\|}$; when the transmission axis is **perpendicular to** the plane of the light beams, refer to the transmitted light intensity as $B_{\perp}$.

(e) $B_{\|} = B_{\perp}$

(f) $B_{\|} > B_{\perp}$

(g) $B_{\|} < B_{\perp}$

(h) Need more information to evaluate the relative magnitude of $B_{\|}$ and $B_{\perp}$.