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1)  $n=1$   $\theta_1 = 37^\circ$  Air (1)

$n=1.36$   $\theta_2$  ETHANOL (2)

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\sin \theta_2 = \frac{n_1 \sin \theta_1}{n_2}$$

$$\theta_2 = \sin^{-1} \left( \frac{n_1 \sin \theta_1}{n_2} \right)$$

$$= \sin^{-1} \left( \frac{1 \sin 37^\circ}{1.36} \right)$$

$$\theta_2 = 26.3^\circ$$

$$2) \quad n=1.00 \quad \theta_1=45^\circ \quad \text{air} \quad 1$$

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$$n=1.52 \quad \theta_2=? \quad \text{CROWN GLASS} \quad 2$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\frac{1.00 (\sin 45^\circ)}{1.52} = \frac{1.52 \sin \theta_2}{1.52}$$

$$.465 = \sin \theta_2$$

$$\sin^{-1}(.465) = \theta_2$$

$$\boxed{27.7^\circ = \theta_2}$$

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$$3) \quad n_1=1.00 \quad \theta_1=30^\circ \quad \text{air}$$

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$$n_2=1.33 \quad \theta_2=? \quad \text{water}$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\frac{1.00 \sin 30^\circ}{1.33} = \frac{1.33 \sin \theta_2}{1.33}$$

$$.376 = \sin \theta_2$$

$$\sin^{-1}(.376) = \theta_2$$

$$\boxed{22.1^\circ = \theta_2}$$

4.)

$$\text{air} \quad n = 1.00 \quad \theta_1 = 45^\circ$$

$$\text{diamond} \quad n = 2.42 \quad \theta_2 = ?$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\frac{1.00 \sin 45^\circ}{2.42} = \frac{2.42 \sin \theta_2}{2.42}$$

$$.292 = \sin \theta_2$$

$$\sin^{-1}(.292) = \theta_2$$

$$17^\circ = \theta_2$$

5.)

$$\text{water} \quad n_1 = 1.33 \quad \theta_1 = 31^\circ$$

$$\text{Block} \quad n_2 = ? \quad \theta_2 = 27^\circ$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$\frac{1.33 \sin 31^\circ}{\sin 27^\circ} = \frac{n_2 \sin 27^\circ}{\sin 27^\circ}$$

$$1.51 = n_2$$