REFLECTION AND REFRACTION QUIZ 1.0

Snell's Law of Refraction : $n_1 \sin \theta_1 = n_2 \sin \theta_2$

$$n_{medium} = \frac{c}{v_{medium}}$$

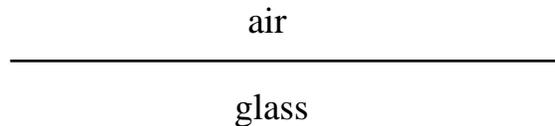where $c = 3 \times 10^8$ m/s (the speed of light in a vacuum)

$n_{water} = 1.33$

$1.4 < n_{glass} < 1.6$

$n_{diamond} = 2.4$

1. A laser beam is traveling in glass (with $n_{glass} = 1.4$) toward a smooth interface with air. The angle of incidence is 40°. (a) Draw and give the measures of all angles of reflection and refraction. (b) Find the critical angle.

air
_____
glass

2. Shown at the right is a pool of water with a coin 2 meters deep. A ray of light from the coin exits into the air with an angle of refraction of 50° and reaches the eye of a student standing by the pool edge. (a) Draw a ray diagram which helps to locate the image of the coin. (b) Find the apparent depth of the coin.
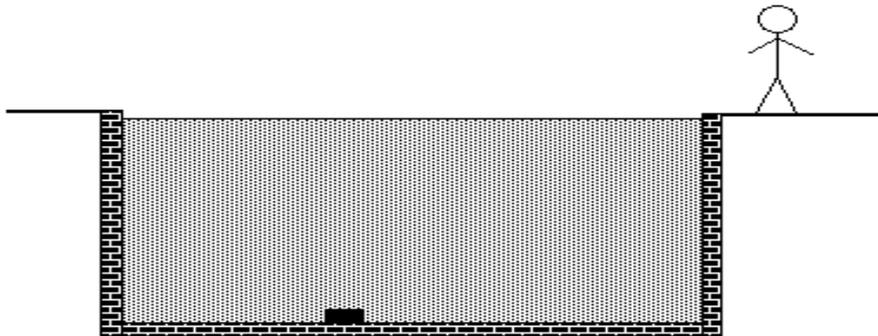
3. Shown below is a ray of light entering oil from the air with an angle of incidence of 60°. Draw a ray diagram showing all the reflected and refracted rays with their angle measures.

air
_____
$n_{oil} = 1.45$
_____
$n_{water} = 1.33$
_____
air