

## Unit 7.5

## Practice Questions - Answers

1) Light in air  $n = 1.00$   $\theta_r = ?$   
 Light in diamond  $n = 2.52$   $\theta_i = 10.0^\circ$

$$n_1 \sin \theta_r = n_2 \sin \theta_i$$

$$1.0 (\sin \theta_r) = 2.52 (\sin 10.0^\circ)$$

$$\sin \theta_r = 0.4376$$

$$\theta_r = \sin^{-1}(0.4376)$$

$$\theta_r = 25.95 \quad \boxed{\theta_r = 26.0^\circ}$$

1)  $n_1 = 1.00$   $\theta_i = 10.0^\circ$   
 $n_2 = 2.52$   $\theta_r = ?$

$$1.00 (\sin 10^\circ) = 2.52 (\sin ?)$$

$$0.1736 = 2.52 (\sin \theta_r)$$

$$0.0717 = \sin \theta_r$$

$$\boxed{4.11^\circ = \theta_r}$$

2)

$$2.42 = \frac{3.00 \times 10^8 \text{ m/s}}{v} \quad v = ?$$

$$2.42(v) = 3.00 \times 10^8 \text{ m/s}$$

$$v = 1.24 \times 10^8 \text{ m/s}$$

3)

$$\frac{3.00 \times 10^8 \text{ m/s}}{1.95 \times 10^8 \text{ m/s}} = n$$

$$1.54 = n$$

$$4) \sin \theta_{ic} = \frac{1}{n}$$

$$\sin \theta_{ic} = \frac{1}{1.58}$$

$$\theta_{ic} = \sin^{-1}(0.632911)$$

$$\theta_{ic} = 39.3^\circ$$

5)

$$\sin 52.0 = \frac{1}{n}$$

$$0.788 = \frac{1}{n}$$

$$n = \frac{1}{0.788}$$

$$n = 1.27$$

$$n \sin \theta_{ic} = 1$$

$$n = \frac{1}{\sin \theta_{ic}}$$