

Snell's Law

1.) What is the speed of light in a clear plastic whose index of refraction is 1.40?

Answer -

2.) The speed of light in a clear liquid is $2.3 \times 10^8 \frac{m}{s}$. What is its index of refraction?

Answer -

3.) A beam of light strikes the surface of a block of glass ($n = 1.50$) and produces a refracted angle of 10.0° . What is the incident angle?

Answer -

4.) What is the wavelength of light in water ($n = 1.33$) if its wavelength in air is $5.30 \times 10^{-7} m$?

Answer -

5.) Monochromatic liquid (light of one color) has a wavelength of $6.0 \times 10^{-7} m$ in air and $5.0 \times 10^{-7} m$ in a clear liquid. What is the index of refraction of the clear liquid?

Answer -

6.) Monochromatic light has a wavelength of $5.75 \times 10^{-7} m$ in air and $4.32 \times 10^{-7} m$ in a clear liquid. If a ray of light enters this clear liquid at an angle of incidence of 25.0° , what is the angle of refraction?

Answer -

7.) Monochromatic light has a wavelength of $5.20 \times 10^{-7}m$ in air and $3.91 \times 10^{-7}m$ in a clear liquid. What is the speed of light in the clear liquid?

Answer -

8.) What is the index of refraction of a substance if the angle of incidence of this substance is 53.0° and the angle of refraction in this substance is 41.0° ?

Answer -

9.) A ray of light strikes the surface of water ($n = 1.33$) at an angle of 60.0° from the water surface. What is the angle of refraction?

Answer -

10.) What is the critical angle for an air-glass interface if the index of refraction of glass is 1.50?

Answer -

11.) What is the critical angle for a water-lucite interface if the index of refraction of water is 1.33 and of Lucite is 1.51?

Answer -

12.) The critical angle for a certain liquid-air interface is 48.8° . What is the index of refraction of the liquid?

Answer -

13.) What is the critical angle of a substance whose index of refraction is 1.81?

Answer -

14.) What is the index of refraction of a substance whose critical angle is 42.0° ?

Answer -

15.) The speed of light in a clear liquid is three quarters the speed of light in air. What is the critical angle of the liquid?

Answer -

16.) A ray of light travels from air into water and then into glass ($n = 1.50$) as shown below. Find the angle of the refraction in the glass.

Answer -

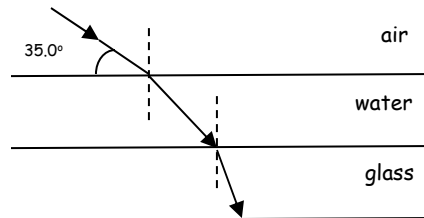


Diagram is not drawn to scale

17.) A ray of light travels from glass ($n = 1.50$) into water and then into air as shown below. Find the angle that the light leaves the water-air interface.

Answer -

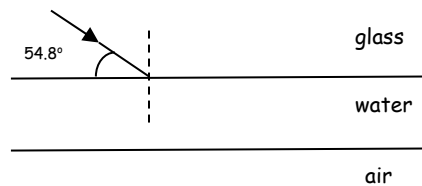


Diagram is not drawn to scale

18.) A ray of light strikes a side of an equilateral Lucite prism ($n = 1.50$) at an angle of 36° as shown below. Find the angle that the light leaves the prism.

Answer -

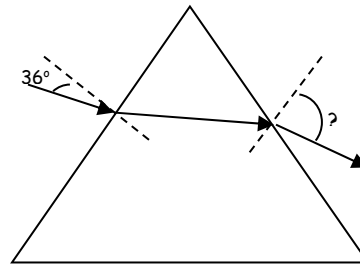


Diagram is not drawn to scale

19.) A ray of light strikes a side of Lucite ($n = 1.50$) prism at 40° as shown below. Find the angle that the light leaves the prism.

Answer -

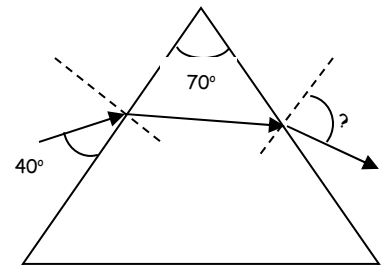


Diagram is not drawn to scale

20.) A ray of light reflects from a mirror onto the surface of a clear liquid as shown in the diagram. Determine the index of refraction of the liquid.

Answer -

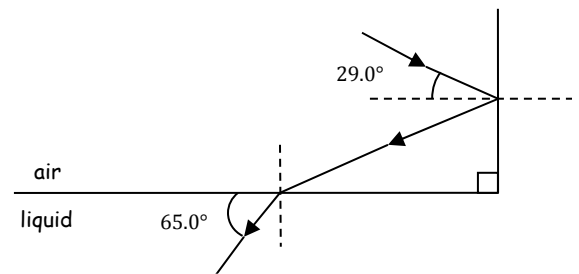


Diagram is not drawn to scale

21.) A ray of light travels through a clear liquid into a clear plastic as shown in the diagram. Find the index of refraction of the plastic compared to the liquid.

Answer -

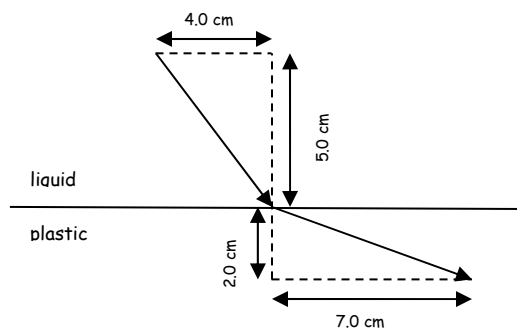


Diagram is not drawn to scale

22.) What is the frequency of light in diamond ($n = 2.42$) if the frequency in air is $6.20 \times 10^{14} \text{ Hz}$?

Answer -

23.) Monochromatic light of a wavelength of $6.22 \times 10^2 \text{ nm}$ enters lucite ($n = 1.51$). What is the frequency of the light in the Lucite?

Answer -

24.) Monochromatic light of a wavelength of $4.00 \times 10^{-7} \text{ m}$ enters water. What is the period of the light in water?

Answer -

25.) The period of a light wave in air is $1.70 \times 10^{-15} \text{ s}$. What is its wavelength in water?

Answer -

- Answers - 1.) $2.14 \times 10^8 \frac{\text{m}}{\text{s}}$ 2.) 1.3 3.) 15.1° 4.) $3.98 \times 10^{-7} \text{ m}$ 5.) 1.2 6.) 18.5° 7.) $2.26 \times 10^8 \frac{\text{m}}{\text{s}}$ 8.) 1.22 9.) 22.1°
- 10.) 41.8° 11.) 61.7° 12.) 1.33 13.) 33.5° 14.) 1.49 15.) 48.6 16.) 33.1° 17.) 59.8° 18.) 64° 19.) 71.8°
- 20.) 2.07 21.) 0.65 22.) $6.20 \times 10^{14} \text{ Hz}$ 23.) $3.19 \times 10^{14} \text{ Hz}$ 24.) $1.33 \times 10^{-15} \text{ s}$ 25.) $3.83 \times 10^{-7} \text{ m}$