

Section 2

A seismic wave causes the surface of the Earth to vibrate. The vibration at a building some distance from the epicentre of the earthquake has a period of 2.0 s.

A second building is 1.0 km farther from the epicentre. The vibration at the second building is $\frac{\pi}{3}$ radians out of phase with that at the first building.

What is the speed of the wave?

(Assume that the wavelength is greater than the separation of the buildings.)

A $\frac{1.5}{\pi} \text{ km s}^{-1}$

B $\frac{3.0}{\pi} \text{ km s}^{-1}$

C 1.5 km s^{-1}

D $\frac{6.0}{\pi} \text{ km s}^{-1}$

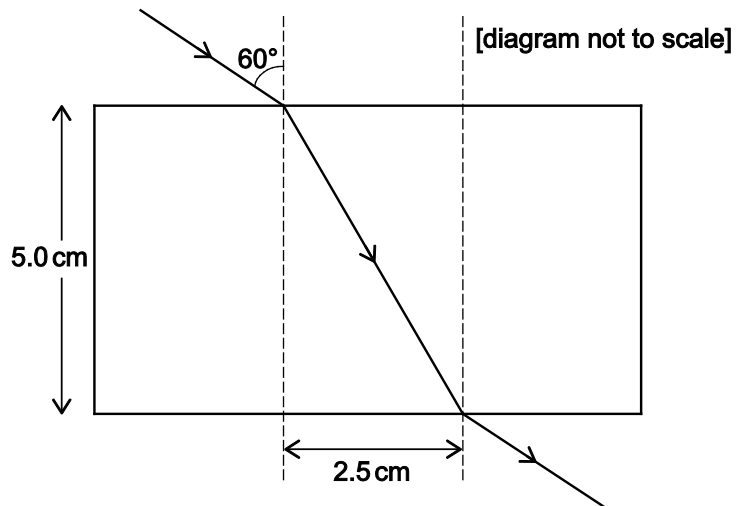
E 3.0 km s^{-1}

F $\frac{12.0}{\pi} \text{ km s}^{-1}$

G 6.0 km s^{-1}

H 12 km s^{-1}

A ray of light in air strikes the surface of a rectangular transparent block at an angle of 60° to the normal. The ray passes through the block and exits from the far side as shown. The width of the block is 5.0 cm and the distance between the normal at the point of entry to the block and the normal at the point of exit from the block is 2.5 cm.



What is the refractive index of the block?

- A $\frac{2}{\sqrt{15}}$
- B $\frac{1}{\sqrt{3}}$
- C $\frac{1}{\sqrt{2}}$
- D $\frac{2}{\sqrt{5}}$
- E $\frac{\sqrt{5}}{2}$
- F $\sqrt{2}$
- G $\sqrt{3}$
- H $\frac{\sqrt{15}}{2}$

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