2017 Ph H1 Q13

Section: Particles and Waves

Topic: Refraction of Light

Question Summary

A ray of blue light passes from air into a transparent block. From the diagram, the angles imply incidence ≈ 60° in air and refraction ≈ 40° in the block. Find the speed of light in the block.

Worked Solution

Snell’s law (air to block): $n = \sin i / \sin r$ (taking $n_{air} \approx 1$).

With $i = 60°$ and $r = 40°$, $n = \sin 60° / \sin 40° \approx 0.866 / 0.643 \approx 1.35$.

Speed in the block $v = c / n \approx 3.00 \times 10^8 / 1.35 \approx 2.23 \times 10^8$ m s^{-1}.

Final Answer

D — 2.23×10^8 m s^{-1}

Revision Tips

• Use $v = c/n$ once the refractive index is found from Snell’s law.

• Always use angles to the normal. Round sensibly to match data/MI.