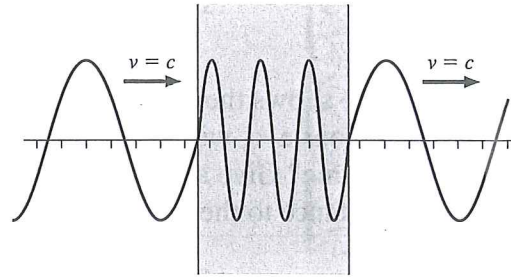


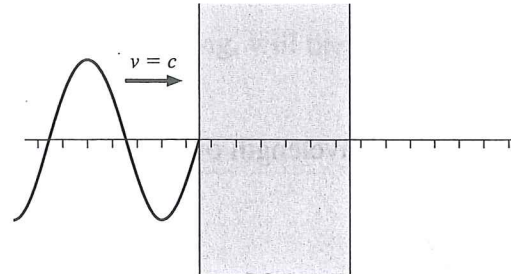
## Ch. 17 Conceptual Questions!

## 17.1 What is Light?

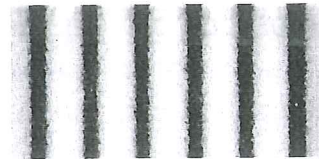
1. A light wave travels from vacuum, through a transparent material, and back to vacuum. What is the index of refraction of this material? Explain.



2. A light wave travels from vacuum, through a transparent material whose index of refraction is  $n = 2.0$ , and back to vacuum. Finish drawing the snapshot graph of the light wave at this instant.



5. The figure shows the viewing screen in a double-slit experiment. For questions a–c, will the fringe spacing increase, decrease, or stay the same? Give an explanation for each.



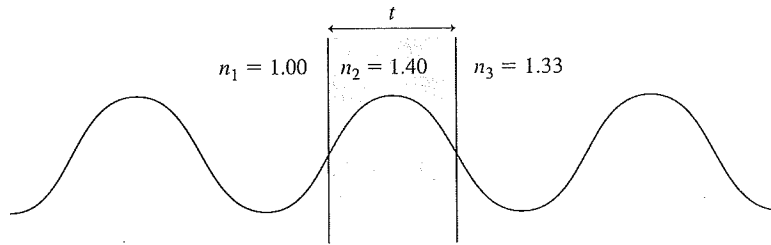
a. The distance to the screen is increased.

b. The spacing between the slits is increased.

c. The wavelength of the light is increased.

## 17.4 Thin-Film Interference

11. The figure shows a wave transmitted from air through a thin oil film on water. The film has a thickness  $t = \lambda_{\text{oil}}/2$ , where  $\lambda_{\text{oil}}$  is the wavelength of the light while in the oil.



- Referring to the indices of refraction shown on the figure, indicate at each boundary with a Y (yes) or N (no) whether the reflected wave undergoes a phase change at the boundary.
- Notice the indices of refraction shown on the figure. At each of the two boundaries, write at the bottom of the figure a Y (yes) or N (no) to indicate whether the reflected wave undergoes a phase change at that boundary.

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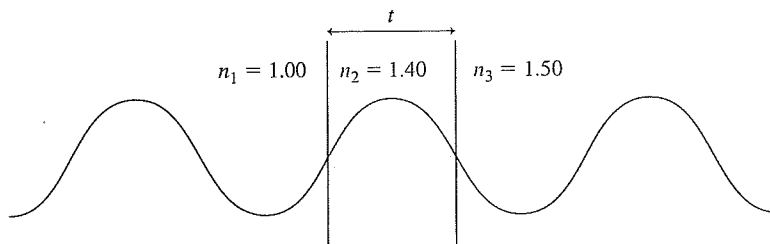
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- Do the two reflected waves interfere constructively, destructively, or in between? Explain.

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12. The figure shows a wave transmitted from air through a thin oil film on glass. The film has a thickness  $t = \lambda_{\text{oil}}/2$ , where  $\lambda_{\text{oil}}$  is the wavelength of the light while in the oil.



- Referring to the indices of refraction shown on the figure, indicate at each boundary with a Y (yes) or N (no) whether the reflected wave undergoes a phase change at the boundary.
- Notice the indices of refraction shown on the figure. At each of the two boundaries, write at the bottom of the figure a Y (yes) or N (no) to indicate whether the reflected wave undergoes a phase change at that boundary.

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- Do the two reflected waves interfere constructively, destructively, or in between? Explain.

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