

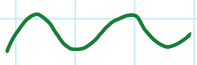
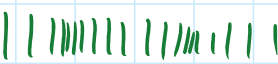
Waves Review

Tuesday, May 29, 2018 1:59 PM

Test on Wed, 34 marks

- diagrams - labelling
- M.C.
- calculations

Water, Sound, Light

2 Types - Transverse  } know parts
- Longitudinal  } where they occur

Universal Wave Equation

$$v = f \cdot \lambda, \quad f = \frac{1}{T}, \quad T = \frac{1}{f}$$

\uparrow Hz \leftarrow sec.

(once every $\overset{*}{\text{sec}}$)
T, f

ex: A water wave travels at 1.7 m/s with a frequency of 7.5 Hz. What is its λ , T

$$\begin{array}{l} v = f \cdot \lambda \\ 1.7 \text{ m/s} = 7.5 \text{ Hz} (\lambda) \\ \lambda = 0.23 \text{ m} \end{array} \quad \left| \quad \begin{array}{l} T = \frac{1}{f} = \frac{1}{7.5} = .13 \text{ sec} \end{array} \right.$$

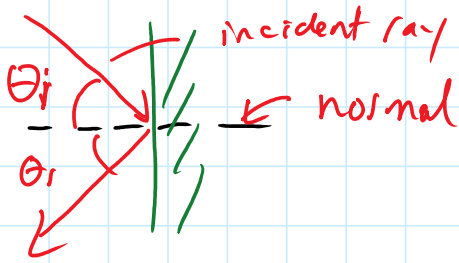
$v_{\text{Sound}} = 330 \text{ m/s}$, $v_{\text{light}} = 3.0 \times 10^8 \text{ m/s}$

Wave Actions (Phenomena)

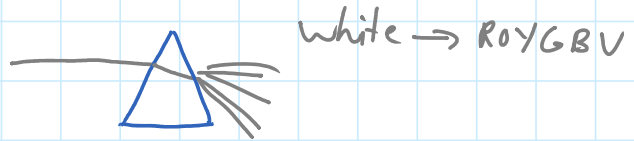
Reflection

dispersion

Reflection



dispersion

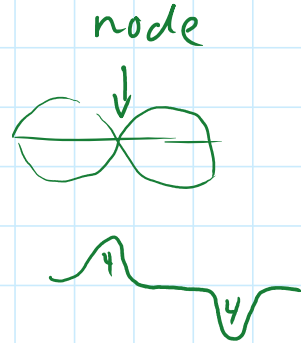
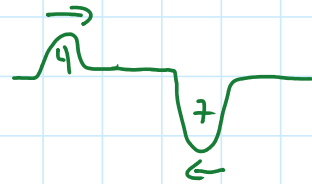


diffraction



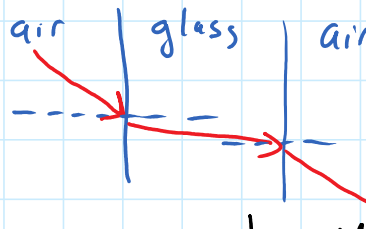
$\lambda \uparrow$ diff \uparrow
open \uparrow diff \downarrow

Interference



refraction

- speed change



$$n = \frac{v_{vac}}{v_{med}}$$

$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

critical angle (refracted = 90°)

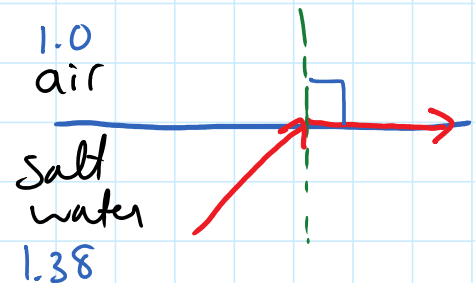
Salt water $n = 1.38$

speed of light in salt water?

$$n = \frac{v_{vac}}{v_{med}} \quad 1.38 = \frac{3.0 \times 10^8}{v_{med}}$$

$$v_{med} = 2.17 \times 10^8 \text{ m/s}$$

salt water into air critical angle



$$n_1 \sin \theta_1 = n_2 \sin \theta_2$$

$$1.38 \sin \theta_c = 1.0 \sin 90^\circ$$

Doppler Effect

Sonic Boom

Visible Light

Polarization

Polarization

Rainbows

$$1.38 \sin \theta_c = \underbrace{1.0 \sin 70^\circ}_{1.0}$$

$$\sin \theta_c = \frac{1}{1.38}$$

$$\theta_c = 46^\circ$$