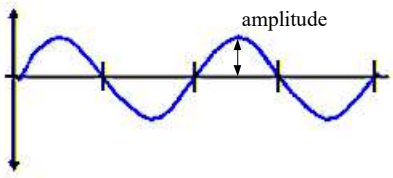
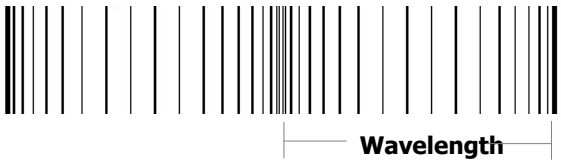
Year 11 Physics Test ***ANSWERS***

Waves

1.



2.



3. $T = \frac{1}{f} = \frac{1}{1.4} = 0.71 \text{ s}$

4. (a) $v = f\lambda = 2.2 \times 0.31 = 0.68 \text{ ms}^{-1}$

(b) All water waves move the same speed regardless of frequency.

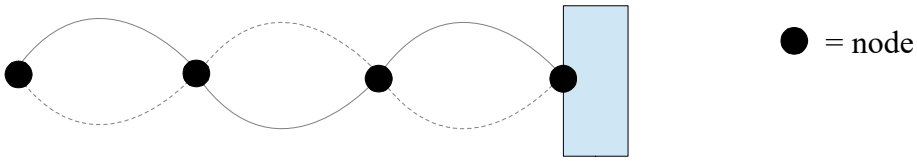
5. $\lambda = \frac{v}{f} = \frac{3.00 \times 10^8}{101.7 \times 10^6} = 2.95 \text{ m}$

6. (a) **Forced** vibration

(b) If the nearby sound source has the same frequency as the natural frequency of the wine glass, **resonance** occurs. This increases the **amplitude** of the vibration which may be enough to shatter it.

7.

(a)



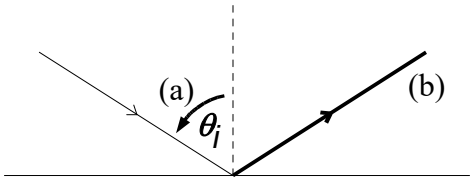
(b) Waves reflecting back from the wall **interfere** with the original wave. A standing wave forms when these vibrations have the **same frequency** as one of the natural (resonant) frequencies of the string.

8. Three beats per second means a beat frequency of 3 Hz. So the other is 237 Hz or 243 Hz.

9. (a) gamma

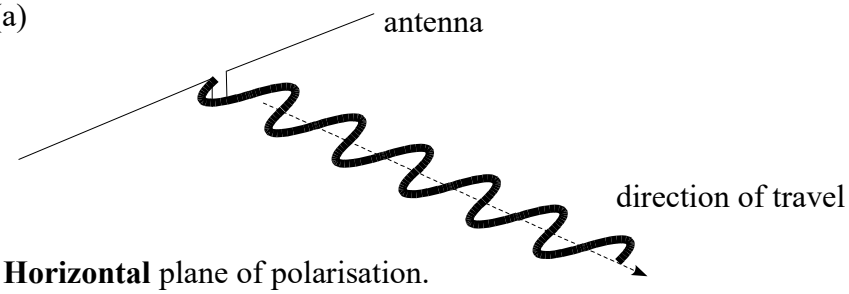
(b) red

10.



11. *[there is no single correct answer for this but it should relate to how the wave **spreads out** after passing an opening or edge]*

12. (a)



Horizontal plane of polarisation.

(b) The receiving antenna should be **horizontal**.

13. (a) $n_1 \sin\theta_i = n_2 \sin\theta_r$

$$\theta_r = \sin^{-1}\left(\frac{n_1 \sin\theta_i}{n_2}\right)$$

$$= \sin^{-1}\left(\frac{1.00 \sin 38.6°}{1.55}\right)$$

$$= 23.7°$$

(b) Critical angle is when θ_r is 90° for light leaving glass into air.

$$n_1 \sin\theta_i = n_2 \sin\theta_r$$

$$\theta_i = \sin^{-1}\left(\frac{n_2 \sin\theta_r}{n_1}\right)$$

$$= \sin^{-1}\left(\frac{1.00 \sin 90.0°}{1.55}\right)$$

$$= 40.2°$$

14. *[there is no single correct answer for this]*