

Waves, phase and interference

Questions · Set 42 · Selected AQA 7408 / OCR A H556 skills
Treat the given values as exact unless an uncertainty is stated.

Question 1

A progressive wave travels at 300 m s^{-1} with frequency 500 Hz. Find its wavelength. Give your answer to 3 significant figures.

waves-interference / wavelength / v1.0.0 / seed 42

Check this question online: [physicshelp.co.uk/tools/waves-interference/](https://www.physicshelp.co.uk/tools/waves-interference/)

Question 2

A wave has period 6 ms. Find its frequency. Give your answer to 3 significant figures.

waves-interference / frequency / v1.0.0 / seed 104771

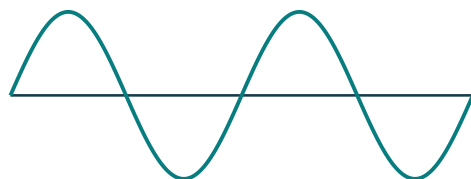
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Question 3

Two points on the same progressive wave are 0.6 m apart along its direction of travel. Wavelength is 0.8 m. Calculate their phase separation as a positive angle from 0° to 360° , using 360° for one wavelength. Keep angles above 180° in this convention. Give your answer to 3 significant figures.



One cycle = λ

waves-interference / phase / v1.0.0 / seed 209500

Check this question online: [physicshelp.co.uk/tools/waves-interference/](https://www.physicshelp.co.uk/tools/waves-interference/)

Question 4

In Young's double-slit experiment, wavelength is 550 nm, slit separation is 0.5 mm and screen distance is 1.2 m. Find adjacent bright-fringe spacing in mm. Use the small-angle approximation. Give your answer to 3 significant figures.

waves-interference / fringe-spacing / v1.0.0 / seed 314229

Check this question online: [physicshelp.co.uk/tools/waves-interference/](https://www.physicshelp.co.uk/tools/waves-interference/)

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Question 5

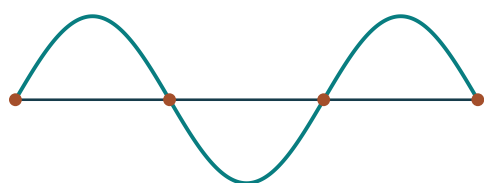
Adjacent nodes of a stationary wave on a string are 0.14 m apart. Find the wavelength of the progressive waves forming it. Give your answer to 3 significant figures.

waves-interference / node-separation / v1.0.0 / seed 418958

Check this question online: [physicshelp.co.uk/tools/waves-interference/](https://www.physicshelp.co.uk/tools/waves-interference/)

Question 6

A string of length 1.2 m is fixed at both ends. Wave speed is 250 m s^{-1} . Find the frequency of harmonic 3. Ignore changes in tension and end effects. Give your answer to 3 significant figures.



3 half-wavelengths in length L

waves-interference / string-harmonic / v1.0.0 / seed 523687

Check this question online: [physicshelp.co.uk/tools/waves-interference/](https://www.physicshelp.co.uk/tools/waves-interference/)

Worked answers

Waves, phase and interference

Keep intermediate values unrounded. Final answers use 3 significant figures.

Question 1

$$\lambda = 300/500 \text{ m.}$$

Answer: $6.00 \times 10^{-1} \text{ m}$ (3 significant figures).

Question 2

$$T = 6 \times 10^{-3} \text{ s.}$$

$$f = 1/(6 \times 10^{-3}) \text{ Hz.}$$

Answer: $1.67 \times 10^2 \text{ Hz}$ (3 significant figures).

Question 3

$$\text{Phase difference} = (0.6/0.8) \times 360^\circ.$$

Answer: $2.70 \times 10^2^\circ$ (3 significant figures).

Question 4

$$w = (550 \times 10^{-9}) \times 1.2/(0.5 \times 10^{-3}) \text{ m.}$$

Multiply the spacing in m by 1000 to give mm.

Answer: 1.32 mm (3 significant figures).

Question 5

$$\lambda = 2 \times 0.14 \text{ m.}$$

Answer: $2.80 \times 10^{-1} \text{ m}$ (3 significant figures).

Question 6

$$\lambda = 2 \times 1.2/3 \text{ m.}$$

$$f = 3 \times 250/(2 \times 1.2) \text{ Hz.}$$

Answer: $3.13 \times 10^2 \text{ Hz}$ (3 significant figures).