



A Level Physics A

H556/02 Exploring physics

Question Set 24

- 1 (a) Fig. 17.1 shows the variation with distance of the displacement of a **stationary** wave at time $t = 0$.

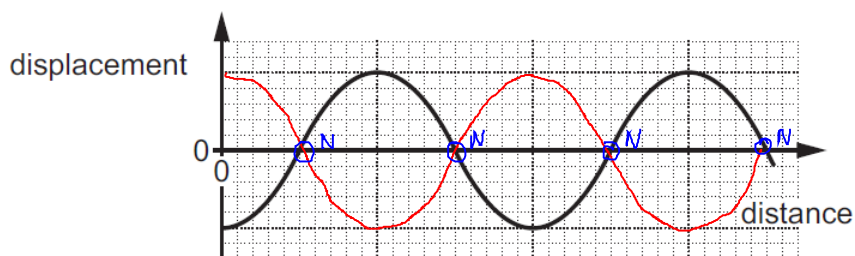


Fig. 17.1

The period of the wave is T .

- (i) On Fig. 17.1, sketch a graph to show the variation of the displacement at time $t = \frac{T}{2}$. [1]
 (ii) On Fig. 17.1, show the positions of **all** the nodes. Label each node **N**. [1]

- (b) Stationary sound waves are formed in a tube closed at one end.

Fig. 17.2 shows three stationary wave patterns formed in the air column of the tube.

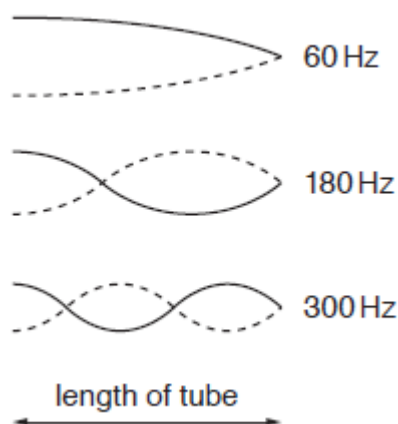


Fig. 17.2

The frequency f of the oscillations for each stationary wave is shown in Fig. 17.2.

Use Fig. 17.2 to explain how the frequency f of the sound wave depends on the wavelength λ .

- length of tube = L
- For 60 Hz wave, $\lambda = 4L$
- For 180 Hz wave, $\lambda = \frac{4}{3}L$
- For 300 Hz wave, $\lambda = \frac{4}{5}L$

$$v = f\lambda$$

$$\rightarrow v = 60 \times 4L = 240L$$

$$\rightarrow v = 180 \times \frac{4}{3}L = 240L$$

$$\rightarrow v = 300 \times \frac{4}{5}L = 240L$$

So $f\lambda$ is constant and f and λ are inversely related; if λ halves, f halves. [3]

Total Marks for Question Set 24: 5

OCR

Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge