OCR
Oxford Cambridge and RSA

AS Level Physics A

H156/01 Breadth in Physics

Question Set 9

1 A long metal wire is stretched between two fixed points across a laboratory bench. The speed v of the transverse wave on the stretched wire is given by the equation

$$v = \sqrt{\frac{T}{\mu}}$$

where T is the tension in the wire and μ is the mass per unit length of the wire.

(a) The SI base units of v, T and μ are shown below.

$$v \rightarrow \text{ms}^{-1} \qquad T \rightarrow \text{kgms}^{-2} \qquad \mu \rightarrow \text{kgm}^{-1}$$

Show that the equation above is homogeneous.

[1]

(b) Describe and explain how you could make use of standard laboratory equipment to determine the mass per unit length μ of the wire. State how you would make your results as precise and accurate as possible.

[3]

(c) The stretched wire of fixed length is used in an experiment to demonstrate stationary waves. The tension in the wire is kept **constant**.
Fig. 26 shows the three stationary wave patterns that can be formed on the stretched wire.

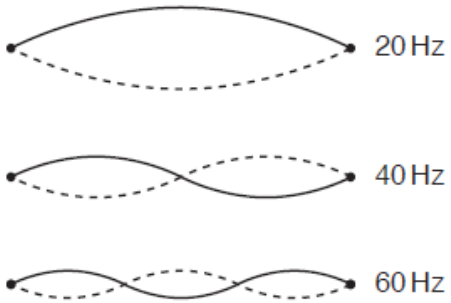

Fig. 26

The frequency f of vibration of the stretched wire for each stationary wave is shown on Fig. 26.
Use Fig. 26 to describe and explain how the wavelength λ of the progressive wave on the stretched wire depends on the frequency of vibration of the wire.

[3]

Total Marks for Question Set 9: 7