

Section A

Answer **all** the questions in this section.

For
Examiner's
Use

- 1 (a) Define simple harmonic motion (s.h.m.).

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.....
..... [2]

- (b) The cone of a loudspeaker is undergoing simple harmonic motion with a frequency of 620 Hz. The amplitude of the oscillations is 0.21 mm.

- (i) Calculate, for the oscillations of the cone,

1. the angular frequency,

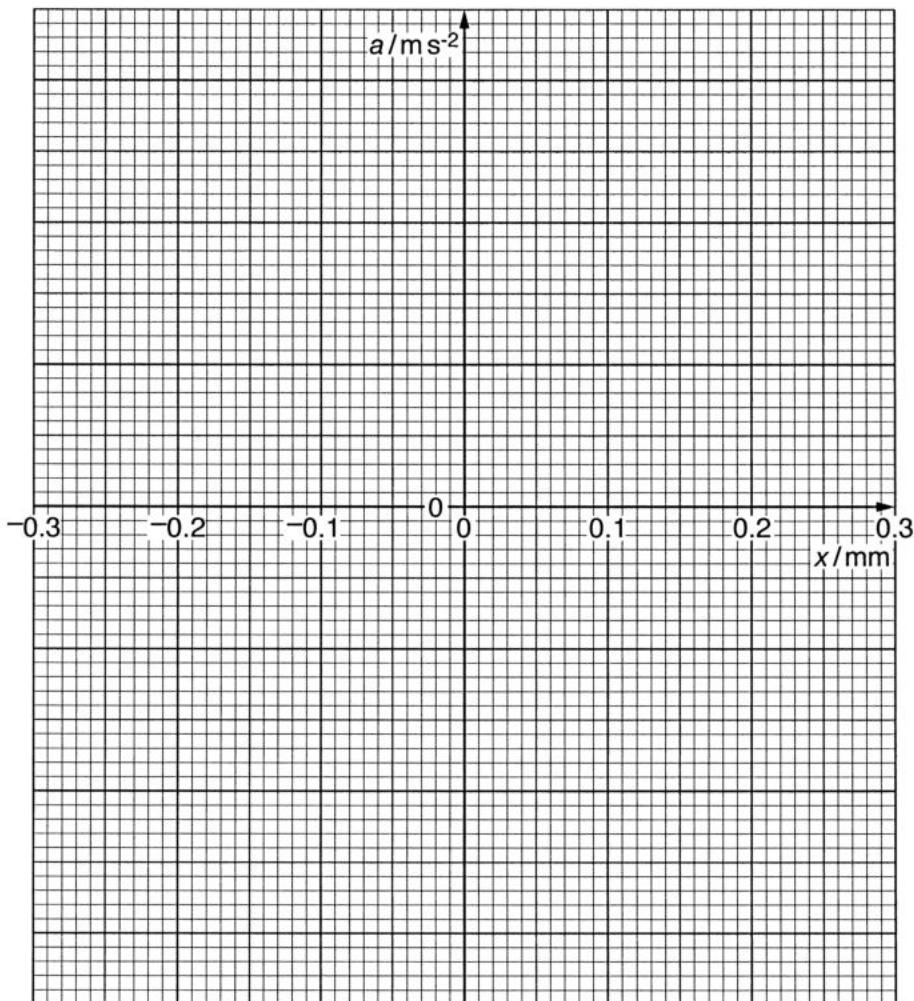
$$\text{angular frequency} = \dots \text{rad s}^{-1} \quad [1]$$

2. the maximum acceleration.

$$\text{acceleration} = \dots \text{m s}^{-2} \quad [2]$$

- (ii) Use your answers in (i) to plot, on the axes of Fig. 1.1, a graph to show the variation with displacement x of the acceleration a of the cone.

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[3]

Fig. 1.1

- (c) In normal use, the loudspeaker in (b) produces a range of frequencies of sound. Suggest why it is important that the natural frequency of vibration of the cone of the loudspeaker is **not** within this range of frequencies.

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[3]