Answer **all** the questions in the spaces provided.

1 **(a)** Define *velocity*.

.....

.....[1]

(b) The speed v of a sound wave through a gas of pressure P and density ρ is given by the equation

$$v = \sqrt{\frac{kP}{\rho}}$$

where k is a constant that has no units.

An experiment is performed to determine the value of k. The data from the experiment are shown in Fig. 1.1.

quantity	value	uncertainty
v	$3.3 \times 10^2\,\text{m s}^{-1}$	± 3%
P	$9.9 \times 10^4\,\text{Pa}$	± 2%
ρ	$1.29\,\text{kg m}^{-3}$	± 4%

Fig. 1.1

(i) Use data from Fig. 1.1 to calculate k.

k = ... [2]

(ii) Use your answer in **(b)(i)** and data from Fig. 1.1 to determine the value of k, with its absolute uncertainty, to an appropriate number of significant figures.

k = ... ± ..... [3]

[Total: 6]

[Turn over