11 PHYSICS ATAR
ASSIGNMENT 1: MEASUREMENT

NAME: _____ DUE DATE: _____ ___/44

1. What is the difference between a ***fundamental unit*** and a ***derived unit***? Give an example of each.

(2)

2. Write the following in ***scientific notation***. Include the units.

(a) 6.43 μm _____ (b) 293 mm _____

(c) 0.0085 C _____ (d) 28.4×10^{-7} s _____

(e) 89.42 nanoseconds _____ (f) 0.0000412 GJ _____

(6)

3. Convert the following to ***standard units***, using scientific notation where possible.

(a) 0.021 mm (b) 4953 million kilometres

(c) 26.4 μs (d) 34.4 m^2

(e) 4.85×10^{-3} mm^3 (f) 756 cm^2

(6)

4. How many significant figures are in the following numbers?

(a) 1.003 _____ (b) 0.0021 _____ (c) 4.61×10^{-4} _____

(d) 2×10^3 _____ (e) 20000 _____ (f) 3000.0 _____

(6)

5. Perform the following calculations, giving your answers to the correct number of significant figures.

(a) 21.6 + 41.24 + 28

(b) $\dfrac{(61.4)(2.4 \times 10^{-4})}{(3.016 \times 10^{-9})}$

(c) $\dfrac{(28.65 + 7.4 - 3.105)}{(2.649 \times 10^{3})}$

(6)

6. A group of students measured a glass rectangular block with the dimensions 10.52 cm x 20.2 cm x 3.2 cm.

(a) Write the dimensions individually, giving the ***absolute uncertainty*** and ***percentage uncertainty***.

length:

width:

height:

(6)

(b) Calculate the volume of the block, giving your answer in scientific notation with the correct number of significant figures and standard units. Include the absolute uncertainty involved.

(3)

7. A group of students investigated the relationship between the volume of a confined gas and its pressure. They understood that the relationship was given by:

$$P = \frac{k}{V},$$

where P = pressure (cm of Hg)
V = volume (Litres)
k = constant.

Their results are given in the table below.

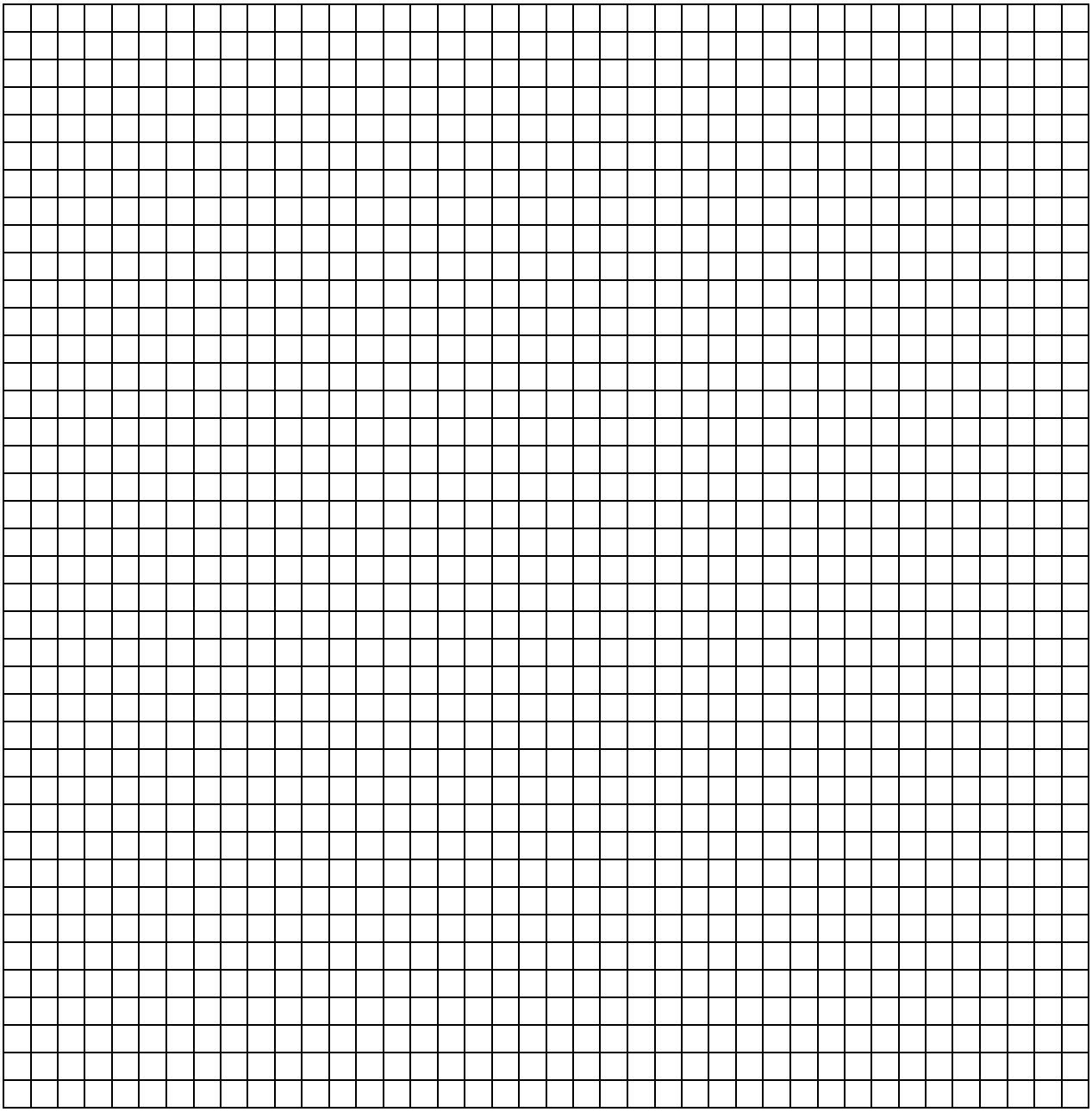
Pressure (cm of Hg)	**Volume (L)**	
20.0	10.0	
30.0	6.7	
40.0	5.0	
50.0	4.0	
60.0	3.3	
70.0	2.9	

(a) Manipulate the data to generate a straight-line graph. Record your data in the vacant column.

(2)

(b) Either graph the data on the grid provided, or use your calculator to generate a line of best fit.

Equation: (4)



(c) Use the graph to determine the value of the constant k.

(3)