SECTION A

Answer ALL questions.

All multiple choice questions must be answered with a cross in the box \boxtimes for the correct answer from A to D.

If you change your mind about an answer, put a line through the box \boxtimes and then mark your new answer with a cross \boxtimes .

1 Select the row of the table that identifies an SI base unit and a derived unit.

		Base unit	Derived unit
X	A	coulomb	ampere
X	В	joule	volt
×	C	newton	kilogram
×	D	second	watt

(Total for Question 1 = 1 mark)

2 A constant current maintained in a copper wire causes the temperature of the wire to increase.

Which of the following does **not** increase?

- A amplitude of vibration of the lattice ions
- **B** number of conduction electrons per unit volume
- The contraction of conduction electrons with lattice ions
- D rate of energy transfer from conduction electrons to lattice ions

(Total for Question 2 = 1 mark)

3 A car of mass 1.5×10^3 kg is travelling at a speed of 25 m s⁻¹. The driver applies the brakes and the car comes to rest.

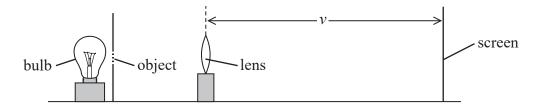
Which of the following gives the decrease in kinetic energy, in joules, as the car is brought to rest?

- \square B 750 × $\left(\frac{25}{2}\right)^2$
- \square C 1500 × (25)²
- \square **D** $1500 \times \left(\frac{25}{2}\right)^2$

(Total for Question 3 = 1 mark)

16 A student carried out an experiment to determine the focal length of a converging lens. The student used a bulb to illuminate an object as shown. The converging lens produced an image of the object on a screen. The student adjusted the position of the screen until the image was in focus.

He repeated the procedure for different distances between the object and the lens. The distance v from the lens to the screen was measured for each lens position.



The student measured the height h_0 of the object and the height h_1 of the corresponding image on the screen for each lens position. The magnification m was calculated.

To determine the focal length f of the lens the student used the equation

$$m = \frac{v}{f} - 1$$

(a) Explain why a graph of m on the y-axis and v on the x-axis should be a straight line.

(2)

(b) The student obtained the following data.

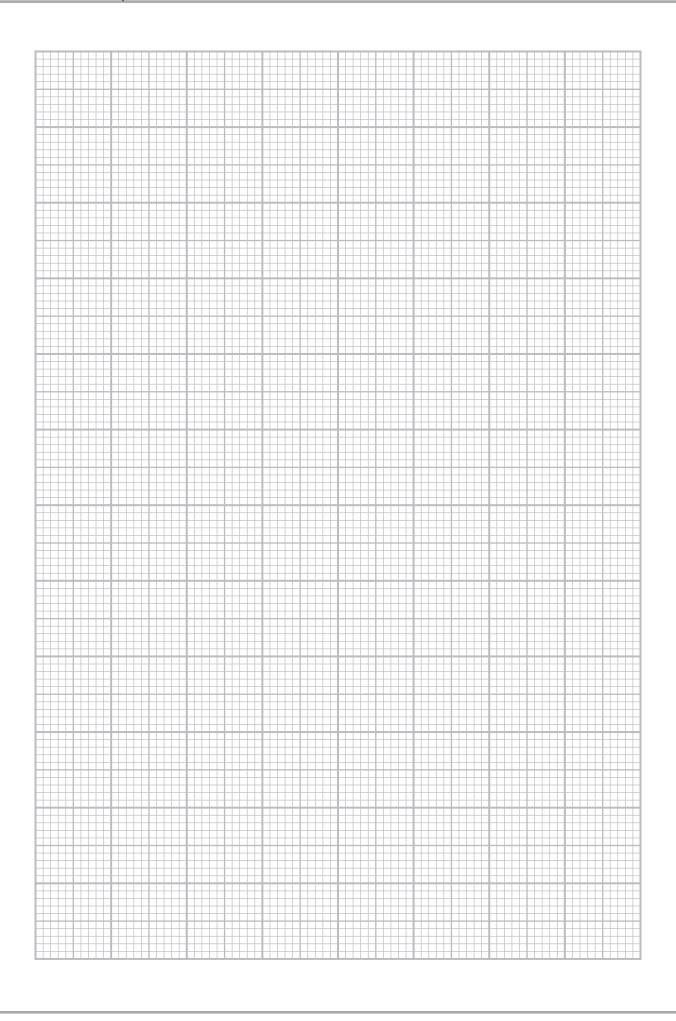
object height,
$$h_o = 2.04 \,\mathrm{cm}$$

v / cm	<i>h</i> _i / cm	m
61.5	5.92	2.90
47.0	4.24	2.08
39.6	3.30	1.62
31.2	2.15	
23.8	1.33	0.652

(i) Complete the table and plot a graph of m against v on the grid opposite.

(6)







(ii) Determine a value for f.	(3)
	f=
	<i>J</i> –
) If the distance from object to the lens produced on the screen.	•
) If the distance from object to the lens produced on the screen. Explain why.	is less than a certain value, no image is
	•
produced on the screen.	is less than a certain value, no image is
produced on the screen.	is less than a certain value, no image is
produced on the screen.	is less than a certain value, no image is
produced on the screen.	is less than a certain value, no image is
produced on the screen.	is less than a certain value, no image is

TOTAL FOR SECTION B = 26 MARKS TOTAL FOR PAPER = 80 MARKS



SECTION A

Answer ALL questions.

All multiple choice questions must be answered with a cross in the box \boxtimes for the correct answer from A to D.

If you change your mind about an answer, put a line through the box \boxtimes and then mark your new answer with a cross \boxtimes .

Which of the following best describes the newton as used in physical measurements?				
×	A	base quantity		
×	В	base unit		
×	C	derived quantity		
×	D	derived unit		
		(Total for Question 1 = 1 mark)		