

Experimental technique

Question Paper 3

Level	International A Level
Subject	Physics
Exam Board	Edexcel
Topic	Experimental technique
Sub Topic	
Booklet	Question Paper 3

Time Allowed:	74 minutes
Score:	/61
Percentage:	/100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 A student has been asked to carry out an experiment to determine the internal resistance of a 1.5 V cell. The circuit will contain the following components: the cell, a switch, a variable resistor, an ammeter and a voltmeter.

(a) Draw a circuit diagram of the circuit.

(1)

(b) State why this experiment is considered to be low risk.

(1)

.....

.....

(c) The teacher says that the resistance of the variable resistor should **not** be reduced to zero.

Suggest why.

(1)

.....

.....

.....

(Total for Question 1 = 3 marks)

- 2 In an investigation of the inverse square law for light, a student measured the radiation flux I of the light at different distances d from a light bulb.

Her results table is shown below.

d/m	$I/\text{W m}^{-2}$	$\frac{1}{d^2} /$
0.125	996	64.0
0.25	276	16.0
0.375	109.3	7.1
0.5	48	4.0
0.75	18	
1	3.3	

- (a) Add a unit for $\frac{1}{d^2}$ to the table.

(1)

- (b) Criticise the results table.

(2)

.....

.....

.....

.....

- (c) Complete the table.

(2)

- (d) The relationship between I and d is given by

$$I = \frac{k}{d^2}$$

where k is a constant.

Explain why a graph of I on the y -axis against $\frac{1}{d^2}$ on the x -axis should be a straight line through the origin.

(2)

.....

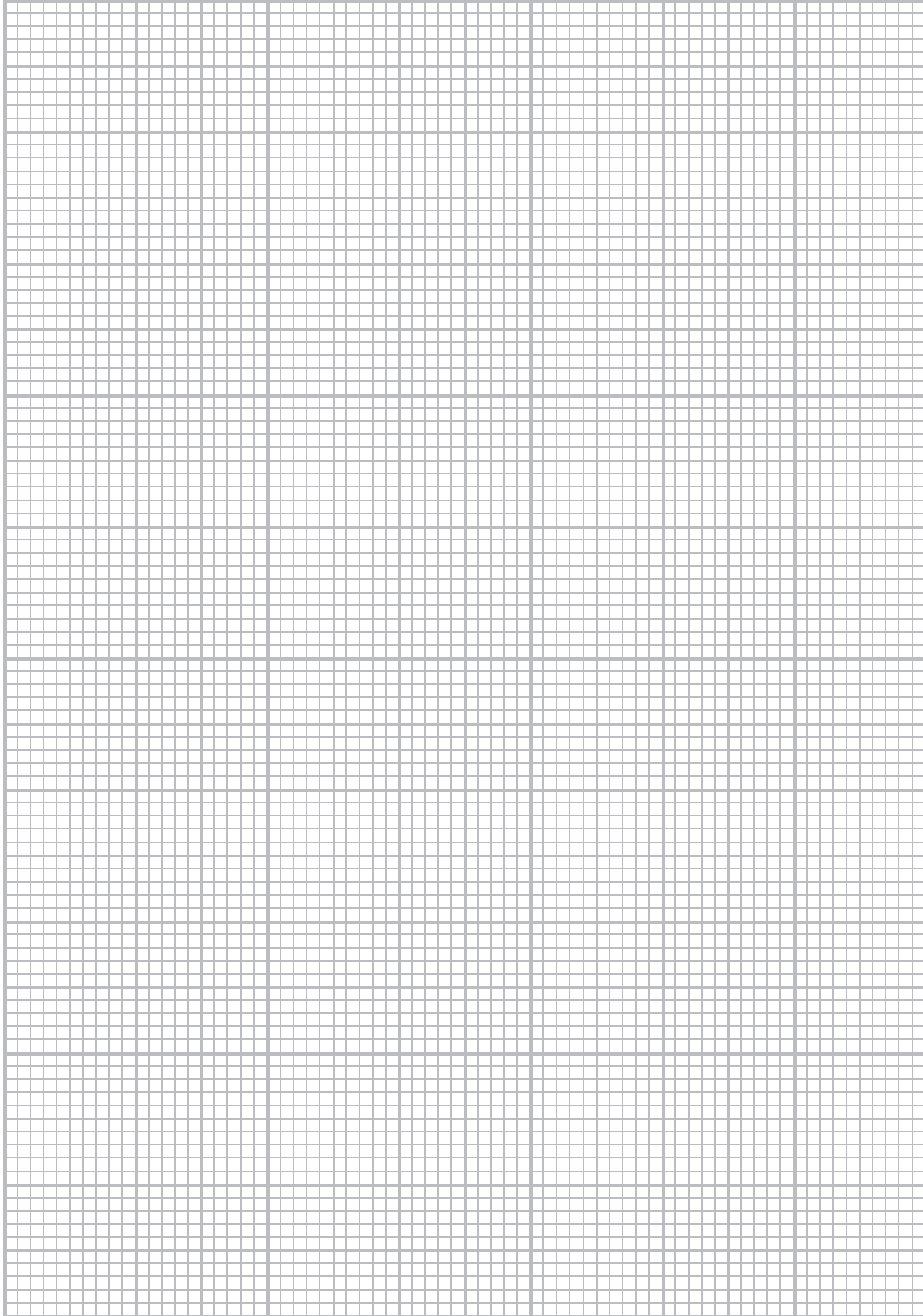
.....

.....

.....

- (e) Plot a graph of I on the y -axis against $\frac{1}{d^2}$ on the x -axis on the grid provided and draw a line of best fit.

(5)



(f) Use your graph to determine I when $d = 20$ cm.

(2)

.....

.....

.....

.....

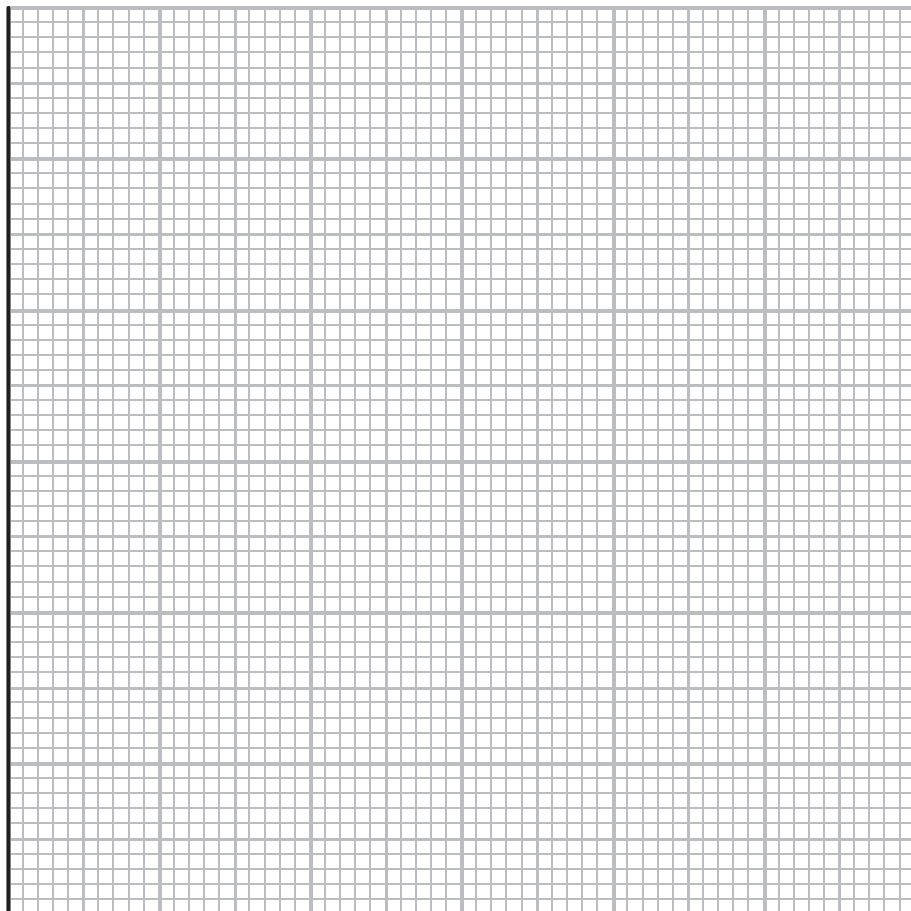
.....

$I = \dots\dots\dots \text{W m}^{-2}$

(Total for Question 2 = 14 marks)

(c) Plot the graph on the grid provided and draw a line of best fit.

(5)



(e) The accepted value for h is 6.63×10^{-34} J s.

Assuming your calculations are correct, suggest why there is a difference between your value for h and the accepted value.

(1)

.....

.....

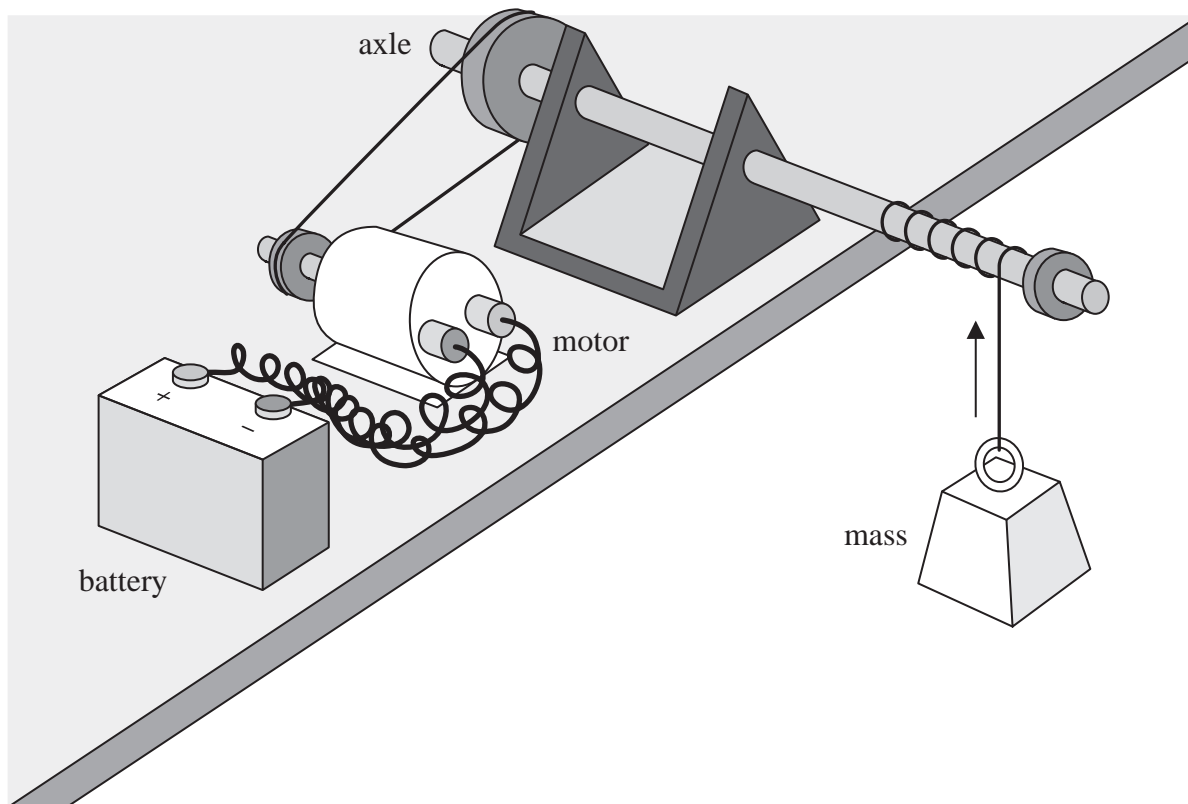
.....

.....

.....

(Total for Question 4 = 18 marks)

- 5 A student is asked to determine the efficiency of a 9 V electric motor when it is used to lift a 1 kg mass at a steady speed. The diagram below shows the apparatus to be used.



Write a plan for an experiment to do this.

You should:

- state the quantities to be measured, (2)
- explain your choice of measuring instrument for **two** of these quantities, (4)
- comment on whether repeat readings are appropriate in this case, (1)
- explain how the data collected will be used to calculate the efficiency of the motor, (3)
- identify the main sources of uncertainty and/or systematic error, (2)
- comment on safety. (1)

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

A series of horizontal dotted lines for writing.

Save My Exams! – The Home of Revision

For more awesome GCSE and A level resources, visit us at www.savemyexams.co.uk/

A series of horizontal dotted lines for writing.

(Total for Question 5 = 13 marks)