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# **GCE A LEVEL MARKING SCHEME**

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**SUMMER 2019**

**A2  
PHYSICS - UNIT 5  
1420U50-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

## **A2 UNIT 5 - EXPERIMENTAL TASK**

### **MARK SCHEME**

#### **GENERAL INSTRUCTIONS**

##### Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (except for the extended response question).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

##### Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

##### Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement.

## Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only  
ecf = error carried forward  
bod = benefit of doubt

Question		Marking details	Marks available											
			AO1	AO2	AO3	Total	Maths	Prac						
(a)		$\ln T = n \ln z + \ln k$ or $\log T = n \log z + \log k$ [or with $e/10$ subs] (1) $\ln T$ on the $y$ -axis and $\ln z$ on the $x$ -axis [or with $\log$ ] (1)		2		2	2	2						
(b)	(i)	Clear labelled diagram must label masses and ruler plus spring drawn correctly (1) Trial readings recorded in this section minimum of 1 pair (1) Repeat readings to be taken <b>and</b> full range used i.e. 100 – 500 g (1) Minimum of 5 oscillations for each weight (1) Method used to measure extension (or length of the spring) and corresponding vertical oscillation is correct (1) <b>Teacher assessed</b>	1	1		5		5						
	(ii)	Risk assessment stated as very low and apparatus set up and working correctly <b>or</b> spring kept within elastic limit <b>or</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Hazard</th> <th style="width: 33%;">Risk</th> <th style="width: 33%;">Control measure</th> </tr> </thead> <tbody> <tr> <td>Clamp stand can topple</td> <td>Injury from clamp stand toppling when in use</td> <td>Securely clamp the stand</td> </tr> </tbody> </table> <b>Teacher assessed</b>	Hazard	Risk	Control measure	Clamp stand can topple	Injury from clamp stand toppling when in use	Securely clamp the stand			1	1		1
Hazard	Risk	Control measure												
Clamp stand can topple	Injury from clamp stand toppling when in use	Securely clamp the stand												
(c)		Clear headings (period / extension / $\ln z$ / $\ln T$ ) and units (s / cm) for all columns (1) Minimum of 5 sets of readings with repeats (1) $T$ mean calculated correctly (1) Both log columns calculated correctly to a minimum of 2 s.f. (1) Resolution of stopwatch 0.01 s and ruler 0.001 m (1)	1	1		5	2	5						
(d)		Titles and units on the axis correct (1) allow <b>ecf</b> from (c) Suitable scales chosen so that the data points occupy at least $\frac{1}{2}$ of each axis and not involving awkward factors, e.g. 3 (1) All points plotted correctly to within $\pm \frac{1}{2}$ small square division <b>ecf</b> (1) Line of best fit drawn correctly (1)	1	1		4	3	4						
(e)		$n$ identified as being the gradient (1) Gradient calculated correctly (1) $\ln k$ identified as the intercept / point taken from the graph (1) $k$ correctly calculated as $\exp(\ln k)$ <b>ecf</b> (1)			4	4	4	4						

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(f)	(i)	$n = 0.5$ identified (1) $k = \frac{2\pi}{\sqrt{g}}$ or $k = 2.00$ units not needed / compare $g$ to 9.81 (1) Sensible comparison for $n$ and $k$ (1)		1 1	1	3	3	3
		(ii)	Larger range of weights [within elastic limit] / use of pointer to measure length / slow motion camera or implied filmed / increase the number of oscillations / any sensible comment NOT light gates / increase repeat readings			1	1		1
			<b>Question total</b>	<b>4</b>	<b>14</b>	<b>7</b>	<b>25</b>	<b>14</b>	<b>25</b>