

IGCSE Physics 4420/03 4437/09  
Mark Scheme (Results)  
November 2008

IGCSE

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The following acronyms are used

<b>owtte</b>	or words to that effect
<b>ecf</b>	error carried forward
<b>dop</b>	dependent on previous
<b>nwn</b>	no working necessary

Question Number	Correct Answer	Extra Information	Mark
1 (a)	funnel	accept 'filter funnel' do not credit 'thistle funnel', 'dropping funnel' etc.	(1)

Question Number	Correct Answer	Extra Information	Mark
1 (b) (i)	use a <u>bored</u> cork/ <u>bored</u> rubber bung/piece of rubber tubing or plastic tubing	accept use a cork/rubber bung with a hole (through)	(1)

Question Number	Correct Answer	Extra Information	Mark
1 (b) (ii)	danger of (it breaking and) <u>cutting</u> you		(1)

Question Number	Correct Answer	Extra Information	Mark
1 (c)(i)	(50 cm <sup>3</sup> ) measuring cylinder	accept : graduated cylinder	(1)

Question Number	Correct Answer	Extra Information	Mark
1 (c)(ii)	13 (cm <sup>3</sup> )		(1)

Question Number	Correct Answer	Extra Information	Mark
1 (d)	stop watch/stop clock		(1)

Question Number	Correct Answer	Extra Information	Mark
1 (e) (i)	appropriate headings	seen anywhere at least once and with no contradiction <u>example</u> volume in cm <sup>3</sup> time taken in s	1
	<u>all</u> in order		1
	unit for volume cm <sup>3</sup> or ml		1
		5            8	
		10           16	
		15           24	
		20           28	
		25           41	
		30           49	(3)

Question Number	Correct Answer	Extra Information	Mark
1 (e) (ii)	<u>both</u> axes labelled including units		1
	volume on the <i>x</i> - axis <u>and</u> time (taken) on the <i>y</i> - axis		1
	all points plotted correctly	each out by 1mm in any direction (-1) down to (0) for points	3
	20,28 identified as anomalous/unexpected		1
	straight line of best fit for the <u>other</u> points	do <u>not</u> give consequential credit for plotting mistakes	1 (7)

Question Number	Correct Answer	Extra Information	Mark
1 (f)	any two points (1) each  to make it a fair test  to have only one (independent) variable  to be able to compare (the engine oil and the cooking oil)  because oil is more/less runny/viscous at different temperatures	do <u>not</u> credit 'less runny at higher temperatures'	(2)

(Total 18 marks)

Question Number	Correct Answer	Extra Information	Mark
2 (a)	do not touch the lamp (it will get hot)	credit any appropriate response  examples 'do not switch on with wet hands (because of danger of electric shock)' 'connect earth wire to lamp'	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (b)	other light cannot get in from the side/ the (black plastic) tube stops the other light		1
	only a small entrance to the tube so (nearly all the light must enter directly	filament is directly in line with LDR	1
			(2)

Question Number	Correct Answer	Extra Information	Mark
2 (c) (i)	metre rule/tape measure	accept 'ruler/rule'	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (c) (ii)	indicates that the problem is that the end of the metre rule/tape measure cannot be brought to the filament/(front of the) LDR	accept 'ensuring that no parallax error (in making the measurement)'	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (c) (iii)	mark the outside of the lamp or of the LDR (and measure to the marks)	do not credit 'remove the glass from around the filament'	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (d) (i)	5.8 (V)	No tolerance	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (d) (ii)	7.2 (mA)	No tolerance	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (d) (iii)	810 or correct to two significant figure from candidates answers to (i) and (ii)	Allow correct working but not to two significant figure for (1) e.g. 805.5	(2)

Question Number	Correct Answer	Extra Information	Mark
2 (d) (iv)	that (to 2 sig fig) is the accuracy of the data used to calculate resistance	if only one item of data specified (1)	(2)

Question Number	Correct Answer	Extra Information	Mark
2 (e) (i)	units (either of distance or resistance)	accept centimetres /cm or ohms	(1)

Question Number	Correct Answer	Extra Information	Mark
2 (e) (ii)	the greater the distance from the lamp the greater the resistance (of the LDR)		1
	because less light falls on it		1 (2)

(Total 15 marks)

Question Number	Correct Answer	Extra Information	Mark
3 (a)	<p>any two (1) + (1) each</p> <p><u>examples</u></p> <p>difficult to ensure different samples of sand are equally damp (1) (whereas) sand can easily be made dry (1)</p> <p>to make a fair comparison (1) damp and dry sand have different (crater forming) characteristics (1)</p> <p>there is no water on the Moon (1) (so) the sand/surface there is dry (1)</p> <p>wet sand (might)stick to ball bearing (1) alters its mass (1)</p>	<p>credit any appropriate suggestion</p> <p>credit any appropriate explanation /amplification</p>	(4)

Question Number	Correct Answer	Extra Information	Mark
3 (b)	<p>any two (1) each</p> <p>(otherwise) you would not know (exactly) what had caused the crater</p> <p>same starting condition(s)</p> <p>to be able to compare different experiments</p>		(2)

Question Number	Correct Answer	Extra Information	Mark
3 (c)	<p>any two (1) each</p> <p>to check his results</p> <p>to identify/remove anomalous results</p> <p>to get average results</p> <p>to arrive at reliable results</p>	do not accept 'to get accurate results'	(2)

Question Number	Correct Answer	Extra Information	Mark
3 (d)	14 (mm)		(1)

Question Number	Correct Answer	Extra Information	Mark
3 (e)	the greater the height (the ball dropped from) the greater the radius (of the crater) (1)  not proportional (1)	or the greater the (kin energy of the ball the the crater (1) ora  do not credit 'comes to a maximum/levels off'	(2)

Question Number	Correct Answer	Extra Information	Mark
3 (f)	each axis labelled $x$ - axis 'mass' $y$ - axis 'diameter'  curve/line starts at the origin  convex curve	'height' scores (0/3) accept 'radius'  the shape should be similar to part (e)	1  1  1 (3)

Question Number	Correct Answer	Extra Information	Mark
3 (g)	would not be a fair test (1)  (there should) only be one (independent) variable (1)  (otherwise you) would not know which had caused the effect (1)	owtte  <ul style="list-style-type: none"> <li>• Statement (1)</li> <li>• Reason (1)</li> <li>• Consequence (1)</li> </ul>	(3)

(Total 17 marks)