

Name of the Student: \_\_\_\_\_

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

Q1.

Question Number	Acceptable answers	Additional guidance	Mark
	C	joule per coulomb.	1
	Incorrect Answers: A is reciprocal of volt B is definition of amp D is definition of watt		

Q2.

Question Number	Acceptable Answer	Additional Guidance	Mark
(a)	<ul style="list-style-type: none"> <li>Use a micrometer to measure y and/or z (1)</li> <li>Use Vernier/digital calipers to measure x and/or (1)</li> <li>Mass of slide(s) measured using (top pan) balance/scales (1)</li> <li>Repeat and determine mean for at least one measurement (1)</li> </ul>	<p>(Part (a) and (b) to be marked holistically)</p> <p>MP1 accept <u>digital</u> calipers for a single slide</p> <p>Accept Vernier calipers if it is clear that the thickness of a number of slides is being measured.</p> <p>To award both MP1 &amp; 2, x, y &amp; z must all be referred to.</p> <p>MP4 can be awarded for a reference to averaging any of the measurements.</p>	4

Question Number	Acceptable Answer	Additional Guidance	Mark
(b)	Check zero error on micrometer/calipers/balance Or measure x/y/z of slide in different places Or measure thickness/mass of multiple slides (1)	Accept 'tare' for zero error check on balance	1

Q3.

Question Number	Acceptable Answer	Additional Guidance	Mark
	A description that makes reference to the following: <ul style="list-style-type: none"> <li>(Remove the source and) record background count for specified time and subtract from equivalent quantity (1)</li> <li>Divide by time to give a count rate. (1)</li> </ul>	There needs to be two clear steps. Subtract a count from a count, or a count rate from a count rate and divide a count by time to obtain a count rate.	2

Q4.

Question number	Acceptable answers	Additional guidance	Mark
	A description that makes reference to the following points: <ul style="list-style-type: none"> <li>Refer to <math>v^2 = u^2 + 2as</math> (1)</li> <li>Where <math>s</math> is height reached, <math>v</math> is zero, <math>a = -g</math> (1)</li> <li>So <math>u = \sqrt{2gs}</math> (1)</li> </ul>	Allow argument $\frac{1}{2}mv^2 = mgh$ to get the same results.	3
(ii)	<ul style="list-style-type: none"> <li>Air resistance will act on the popper... (1)</li> <li>...As a decelerating force (1) OR... dissipating energy (1)</li> <li>So the initial speed will be lower than in the absence of air resistance, so the suggestion is not correct (1)</li> </ul>		3

Q5.

Question Number	Acceptable Answer	Additional Guidance	Mark
	<ul style="list-style-type: none"> <li>Photoelectric equation stated in words (1) Or <math>hf = \phi + \frac{1}{2}mv_{\max}^2</math> with <math>\phi</math> defined</li> <li>Hence <math>eV_s = hf - \phi</math> (1) Or <math>E_{k\max} = hf - \phi</math> and <math>E_{k\max} = eV_s</math></li> <li>Compare with <math>y = mx + c</math> (1)</li> <li>So plot a graph of <math>V_s</math> against <math>f</math> (1) Or plot a graph of <math>eV_s</math> against <math>f</math></li> <li>Gradient = <math>\frac{h}{e}</math> (1) Or gradient = <math>h</math></li> </ul>	MP1: Accept $hf_0$ for $\phi$ [with $f_0$ defined], and $E_{k\max}$ for $\frac{1}{2}mv_{\max}^2$  MP2: $eV_s$ does not have to be the subject of the equation  MP5 is dependent upon MP4	5