Practice Question Set For A-Level
Subject : Physics
Paper-3 Topic : Practical Skills

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

Name of the Student:_____
Max. Marks : 16 Marks   **Time : 16 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answers	Additional guidance	Mark
	A uses the parallel resistors equation $\dfrac{1}{R_T} = \dfrac{1}{R} + \dfrac{1}{R} = \dfrac{2}{R}$	$\dfrac{R}{2}$	1
	B assumes resistors in parallel have the same total R as each individual R C is the addition of both resistances as if they were in series D is the product of both resistances		

Q2.

Question Number	Acceptable answers	Additional guidance	Mark
	C	mgh	1
	A uses the distance AB rather than height B uses a component of height D uses a component of height		

Q3.

Question Number	Acceptable Answer		Additional Guidance	Mark
	• The measurement of resistance has an uncertainty of 0.6 %	(1)	MP1 accept use of 0.05 giving 0.3 % Example of calculation: Uncertainty in	
	• The measurement of the length has an uncertainty of 4 %	(1)	$R = \dfrac{0.1\,\Omega}{18.2\,\Omega} \times 100\% = 0.55\%$	
	• The measurement of the diameter has an uncertainty of 4 %	(1)	Uncertainty in $L = \dfrac{0.05\,m}{1.25\,m} \times 100\% = 4.0\%$	
	• The % uncertainty in diameter is doubled giving the greatest amount of uncertainty into the value for the resistivity	(1)	Uncertainty in $d = \dfrac{0.01\,m}{0.27\,m} \times 100\% = 3.7\%$	4

Q4.

Question Number	Acceptable Answer		Additional Guidance	Mark
	• Attempt to calculate gradient	(1)	Accept $k = (0.24 \rightarrow 0.25)$ N cm^{-1} Example of calculation: $$\text{gradient} = \frac{(1.6-0)\,\text{N}}{(6.5-0)\times10^{-2}\,\text{m}} = 24.6\ \text{N m}^{-1}$$	
	• $k = (24.0 \rightarrow 25.0)$ N m^{-1}	(1)		2

Q5.

Question Number	Acceptable answers	Additional guidance	Mark
	B The two forces acting on the mass are its weight (vertically down) and a tension in the thread.		1
	A assumes there is a centripetal force only C assumes there is an additional centripetal force D assumes the additional centripetal force acts away from the centre of the circle		

Q6.

Question Number	Acceptable Answer		Additional Guidance	Mark
(i)	• Mean straight line with positive intercept on the y-axis	(1)		1

Question Number	Acceptable Answer	Additional Guidance	Mark
(ii)	• $C = \dfrac{K}{4\pi d^2}$ used to show $\dfrac{1}{\sqrt{C}} \propto d$ (1) Or identifies gradient as $\sqrt{\dfrac{4\pi}{K}}$ which is constant • Since graph is a straight line, data is consistent with this (1) • However, line doesn't pass through the origin (1) • This indicates a systematic error in measuring the distance (1)		4

Q7.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• α-particles would only travel a few cm (in air), and so wouldn't reach the GM-tube (1)	Accept a reference to α-particles not passing through the side of the tube (even if they reached it when d was small) and so not contributing to the count (rate)	
	• β-particles would probably not pass through the sides of the GM-tube, and so wouldn't be detected so suggestion is correct. (1)	For 2 marks expect a valid conclusion, as well as a statement of the likelihood of the α-particles and β-particles contributing to the count (rate)	2