Name of the Student:_____
Max. Marks : 9 Marks **Time : 9 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable answers		Additional guidance	Mark
(i)	• Use of $V = {}^{Q}/_{4\pi\varepsilon_0 r}$	(1)	Example of calculation 7.30×10^{-13} J = $\left(\frac{8.99\times10^{9}\text{Nm}^2\text{C}^{-2}\times79\times1.6\times10^{-19}\text{C}}{r}\right)\times2\times1.6\times10^{-19}\text{C}$ $r = 4.98 \times 10^{-14}$ m	4
	• Identifies number of (positive) charges for alpha or gold nucleus	(1)		
	• Use of $W = VQ$	(1)		
	• $r = 5 \times 10^{-14}$ m so textbook statement is correct **Or** $V = 7.27 \times 10^{-13}$ J so textbook statement is correct (MP4 dependent on MP1)	(1)		
(ii)	• Use of $E_k = \frac{p^2}{2m}$	(1)	Accept Use of $Ek = \frac{1}{2}mv^2$ and $p = mv$ Example of calculation 7.30×10^{-13} J $= p^2/2 \times 4 \times 1.66 \times 10^{-27}$kg $p = 9.9 \times 10^{-20}$ kg m s^{-1}	3
	• Converts atomic mass to kg	(1)		
	• $p = 9.9 \times 10^{-20}$ kg m s^{-1}	(1)		

Q2.

Question Number	Acceptable answers	Additional guidance	Mark
(i)	• Use of $E = V / d$ **(1)** • $V = 6000$ V **(1)**	Example of calculation 3×10^6 V m^{-1} = V / 0.002 m $V = 6000$ V	**2**
(ii)	• (A spark is) a current (drawn from the supply) **(1)** • A potential difference is produced across the internal resistance of the supply **(1)** • According to $V = E - Ir$ V decreases **Or** (the decrease in V) is large because the internal resistance is large **(1)**	Accept "lost volts" are present/increases Accept reduces the terminal potential difference which is shown on the voltmeter	**3**