Name of the Student:_____

Max. Marks : 17 Marks **Time : 17 Minutes**

Mark Schemes

Q1.

Question Number	Acceptable Answer	Additional Guidance	Mark
(i)	**MAX 3** • Intensity of light varies as an inverse square law **Or** reference to $I = \frac{P}{4\pi d^2}$ **(1)** • the light intensity would not increase uniformly (decreasing the distance as suggested) **(1)** • The student should decrease the distance at decreasing intervals **(1)** • The student should use a greater range (of distances, as lamp is not a point source of light) **(1)**		**3**
(ii)	An explanation that makes reference to the following points: **EITHER** • Carry out experiment under subdued lighting **(1)** • As the ambient lighting will increase the ammeter reading	Allow: Keep the intensity of the lamp constant **Or** Keep angle of lamp constant As this would change the ammeter reading [dependent upon MP1	

	(1) [dependent upon MP1] **OR** **(1)** • Take readings at eye level **(1)** • As this will reduce parallax error [dependent upon MP3] **OR** • Take multiple readings of intensity and calculate a mean **(1)** • As this will reduce the effect of <u>random</u> error **(1)** [dependent upon MP5]		**2**

Q2.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• Ohm's law requires current to be (directly) proportional to the (applied) p.d **(1)** • Hence the line should pass through the origin **(1)** • (There is scatter around the line drawn by the student so) the correct line may be a curve **(1)** • Conclusion that this graph does not meet the conditions for Ohm's law so the student's statement is invalid **(1)**	For MP1 accept Ohm's law requires $I \propto V$ In MP2, credit students who check values from graph to see if I doubles when V doubles In MP3, credit students who draw a curve onto the graph MP4 dependent upon MP2 OR MP3	**4**

Q3.

Question Number	Acceptable Answer	Additional Guidance	Mark
	• Counting for 1 minute is too short a time **Or** he should count for at least 3 minutes (1) (1) • He hasn't recorded the background count rate (1) • More than one reading taken and a mean calculated **Or** should have taken more than two readings (to calculate mean)		3

Q4.

Question Number	Acceptable Answer	Additional Guidance	Mark
	MAX 5 An explanation that makes reference to the following points: • The student has calculated the coun rate rather than the activity of the source (1) (1) • The counts haven't been corrected for background (so there is systematic error in his data) (1) (1) • The GM tube is too far away from the source (1) (1) • α-radiation won't reach the GM-tube as it only has a short range in air (1) • Radiation spreads out from the source, so not all the emitted radiation reaches the GM-tube • GM tube won't detect all the gammas which enter it		5