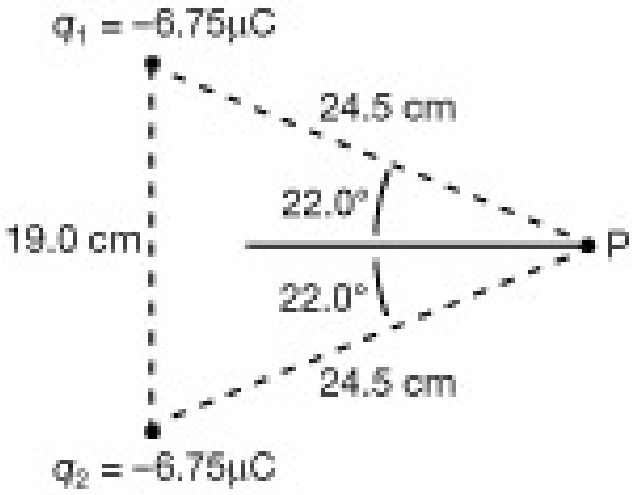
Physics 30 Online

Assignment 2

Question 1

The following diagram shows two charged spheres arranged to the right of a point in space labelled P. Use the information on the diagram to calculate the magnitude and direction of the net electric field at point P.



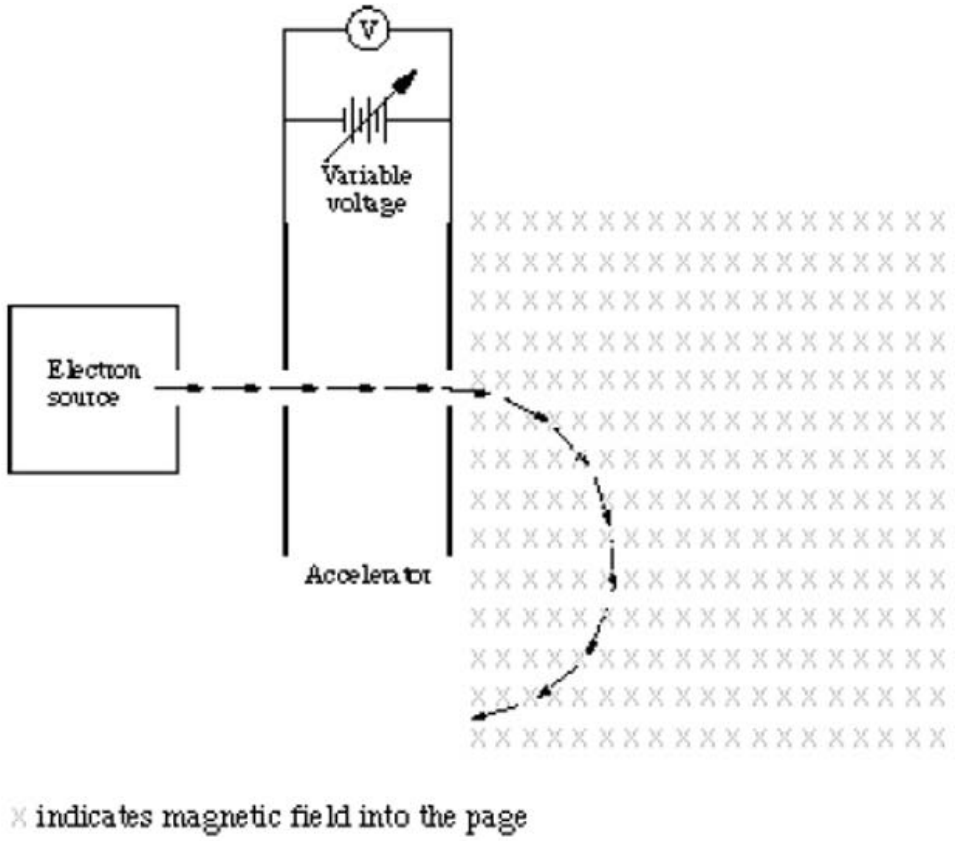
Your answers must clearly communicate your understanding of the physics principles you use to solve these questions. You may communicate this understanding mathematically, graphically, and/or with written statements.

Question 2

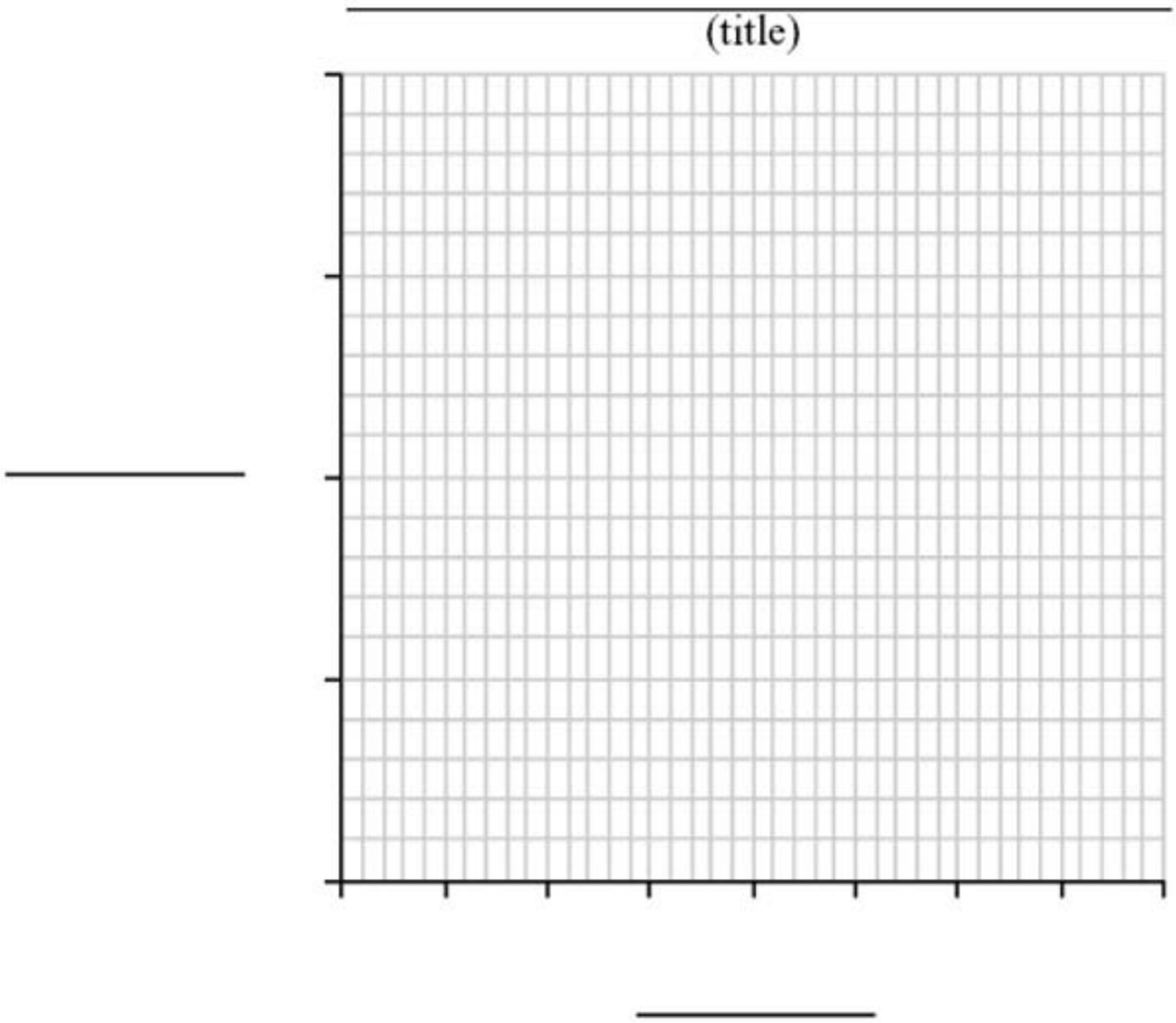
Use the following information to answer this holistic question.

A student used the apparatus shown below to measure the radius of curvature of the path of electrons as they pass through a magnetic field that is perpendicular to their path. This experimental design has the voltage as the manipulated variable, the speed calculated from the voltage, and the radius as the responding variable.

Accelerating Potential Difference (V)	Speed (106 m/s)	Radius (10-2 m)
20.0	2.65	7.2
40.0	3.75	9.1
60.0	4.59	11.0
80.0	5.30	12.8
100.0	5.93	14.1
120.0	6.49	16.3



a. Plot the graph of radius as a function of speed, and construct a best-fit line.



b. Using the slope or other appropriate averaging technique, determine the strength of the magnetic field.

c. Derive the equation that would allow you to calculate the speed of the electrons from the accelerating potential.