

Question 25 (6 marks)

A pair of parallel metal plates, placed in a vacuum, are separated by a distance of 5.00×10^{-3} m and have a potential difference of 1000 V applied to them.

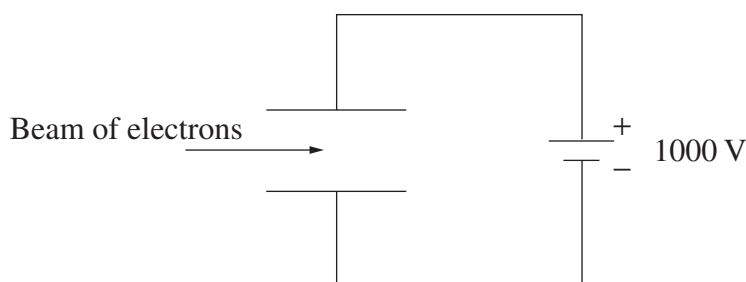
- (a) Calculate the magnitude of the electric field strength between the plates. **1**

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- (b) Calculate the magnitude of the electrostatic force acting on an electron between the plates. **1**

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- (c) A beam of electrons is fired with a velocity of 3.00×10^6 m s⁻¹ between the plates as shown. A magnetic field is applied between the plates, sufficient to cancel the force on the electron beam due to the electric field. **4**



Calculate the magnitude and direction of the magnetic field required between the plates to stop the deflection of the electron beam.

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