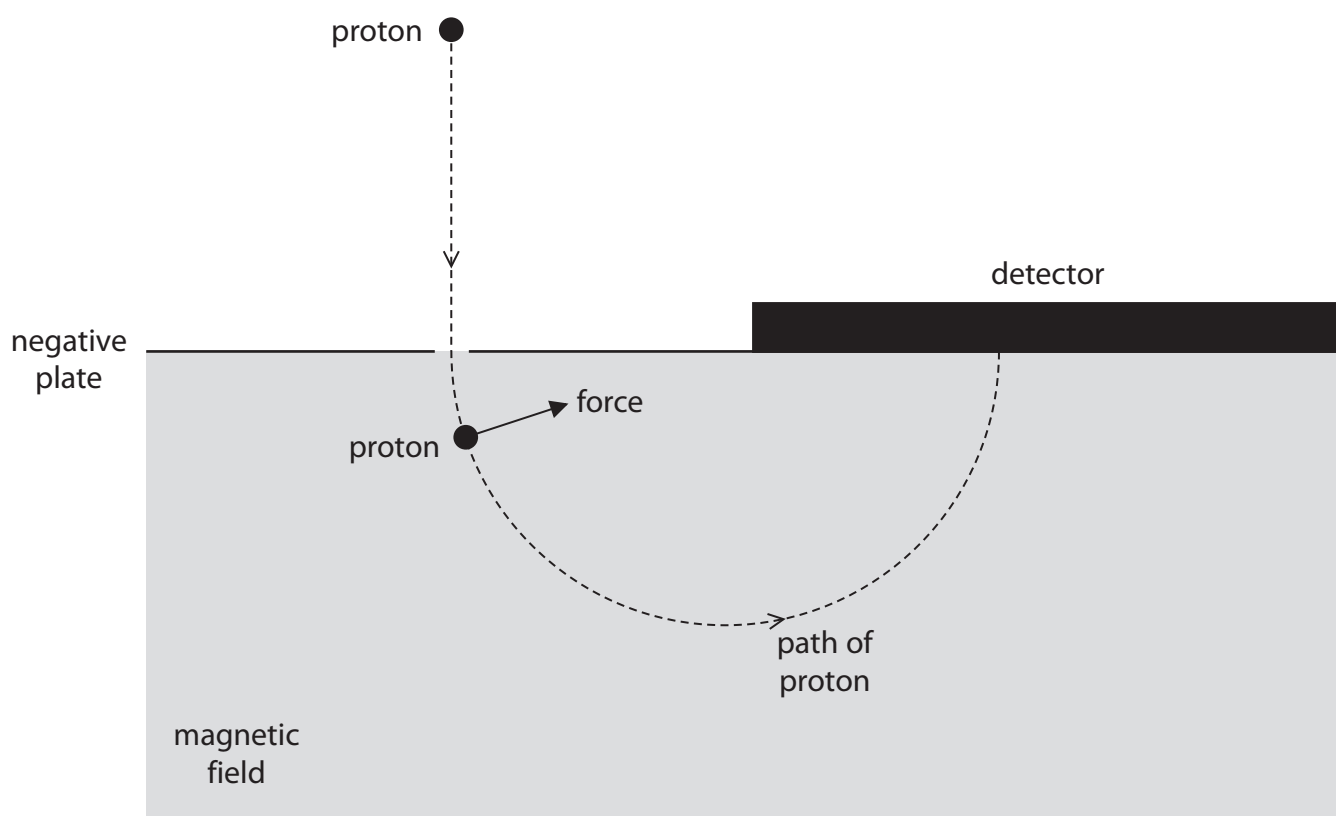**8** The diagram shows a machine that can be used to measure the speed of fast-moving protons.

(a) At the start, the proton is attracted towards a negatively charged plate.

(i) Give a reason why the proton is attracted to the negatively charged plate.

(1)

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(ii) The proton accelerates at 1.90×10^{11} m/s^2 from rest to a speed of 1.38×10^5 m/s.

Show that the time taken for this acceleration is about 7×10^{-7} s.

(3)

(b) The proton passes through a hole in the negatively charged plate and enters an area where there is a magnetic field.

The magnetic field exerts a force on the proton, as shown in the diagram.

This force causes the proton to follow a circular path without changing speed.

(i) Give the direction of the magnetic field.

(1)

....

(ii) Suggest how increasing the strength of the magnetic field will affect the proton when it is moving in the magnetic field.

(2)

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(Total for Question 8 = 7 marks)