6 A uniform electric field is produced between two parallel metal plates. The electric field strength is $1.4 \times 10^4\,\text{N C}^{-1}$. The potential difference between the plates is 350 V.

(a) Calculate the separation of the plates.

separation = ... m [2]

(b) A nucleus of mass 8.3×10^{-27} kg is now placed in the electric field. The electric force acting on the nucleus is 6.7×10^{-15} N.

(i) Calculate the charge on the nucleus in terms of *e*, where *e* is the elementary charge.

charge = ... *e* [3]

(ii) Calculate the mass, in u, of the nucleus.

mass = ... u [1]

(iii) Use your answers in **(b)(i)** and **(b)(ii)** to determine the number of neutrons in the nucleus.

number = ... [1]

[Total: 7]