

**15** In 1908 Rutherford, Geiger and Marsden investigated the interaction of alpha particles with matter. In one set of experiments they directed alpha particles towards a thin gold foil.

(a) State why the alpha source and gold foil were contained in a vacuum.

(1)

\*(b) At that time, one model for the structure of atoms was the plum pudding model proposed by J J Thompson. In this model, the positive charge and mass were spread evenly throughout the atom. Negatively charged electrons were distributed within the atom.

Discuss the extent to which the results of the alpha particle scattering experiments justified replacing the plum pudding model with a nuclear model of the atom.

(6)

(Total for Question 15 = 7 marks)