6 **(a)** Describe the structure of an atom of the nuclide $^{235}_{92}U$.

For Examiner's Use

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..... [2]

(b) The deflection of α-particles by a thin metal foil is investigated with the arrangement shown in Fig. 6.1. All the apparatus is enclosed in a vacuum.

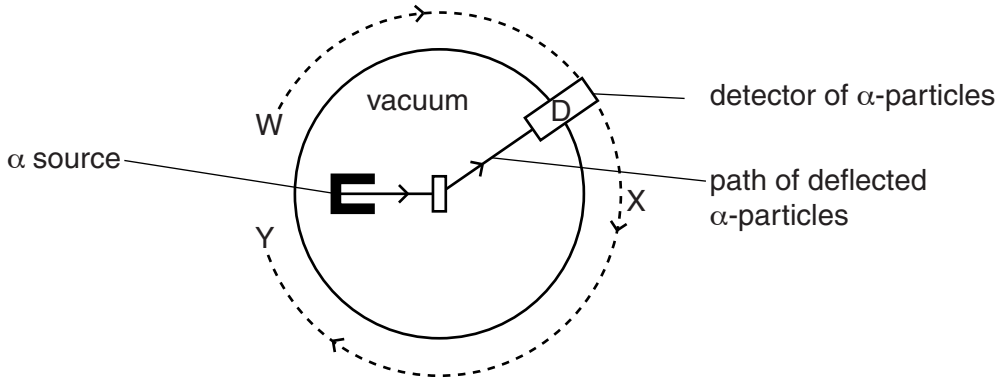

Fig. 6.1

The detector of α-particles, D, is moved around the path labelled WXY.

(i) Explain why the apparatus is enclosed in a vacuum.

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..... [1]

(ii) State and explain the readings detected by D when it is moved along WXY.

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..... [3]

Question 6 continues on page 16.

(c) A beam of α-particles produces a current of 1.5 pA. Calculate the number of α-particles per second passing a point in the beam.

For Examiner's Use

number = ... s^{-1} [3]