

- 6 (a) One of the results of the α -particle scattering experiment is that a very small minority of the α -particles are scattered through angles greater than 90° .

State what may be inferred about the structure of the atom from this result.

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..... [2]

- (b) An α -particle is made up of other particles. One of these particles is a proton.

State and explain whether a proton is a fundamental particle.

.....
..... [1]

- (c) A radioactive source produces a beam of α -particles in a vacuum. The average current produced by the beam is $6.9 \times 10^{-9} \text{A}$.

Calculate the average number of α -particles passing a fixed point in the beam in a time of 1.0 minute.

number = [3]

- (d) The α -particles in the vacuum in (c) enter a uniform electric field. The α -particles enter the field with their velocity in the same direction as the field.

State and explain whether the magnitude of the acceleration of an α -particle due to the field decreases, increases or stays constant as the α -particle moves through the field.

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..... [2]

(e) A nucleus X is an isotope of a nucleus Y. The mass of nucleus X is greater than that of Y.

Both of the nuclei are in the same uniform electric field.

State and explain whether the magnitude of the electric force acting on nucleus X is greater than, less than or the same as that acting on nucleus Y.

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..... [2]

[Total: 10]

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