

8 (a) State **one** piece of experimental evidence for:

- (i) the particulate nature of electromagnetic radiation

..... [1]

- (ii) the wave nature of matter.

..... [1]

(b) (i) Calculate the de Broglie wavelength λ of an alpha-particle moving at a speed of $6.2 \times 10^7 \text{ m s}^{-1}$.

$$\lambda = \dots \text{ m} \quad [3]$$

- (ii) The speed v of the alpha-particle in (b)(i) is gradually reduced to zero.

On Fig. 8.1, sketch the variation with v of λ .

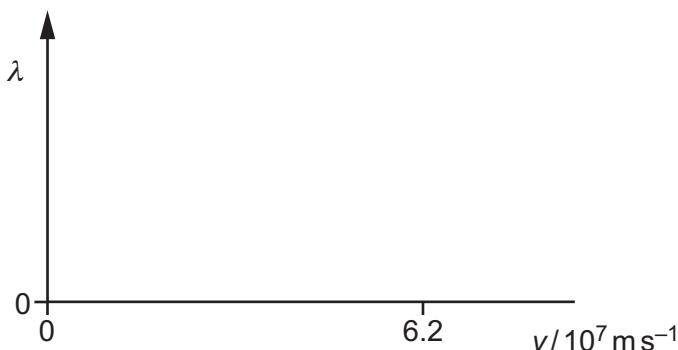


Fig. 8.1

[2]

(c) Suggest an explanation for why people are not observed to diffract when they walk through a doorway.

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..... [1]