

7 (a) State the de Broglie relation, explaining any symbols you use.

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..... [2]

(b) An electron of mass  $m$  has kinetic energy  $E$ . Show that the de Broglie wavelength  $\lambda$  of this electron is given by

$$\lambda = \frac{h}{\sqrt{2mE}}.$$

[2]

(c) Calculate the potential difference through which an electron, initially at rest, must be accelerated so that its de Broglie wavelength is equal to 0.40 nm (the diameter of an atom).

potential difference = ..... V [3]