

- 5 (a) Define electric potential at a point.

.....
.....
..... [2]

- (b) A hydrogen atom may be considered to consist of a proton and an electron separated by a distance of 120 pm, as shown in Fig. 5.1.

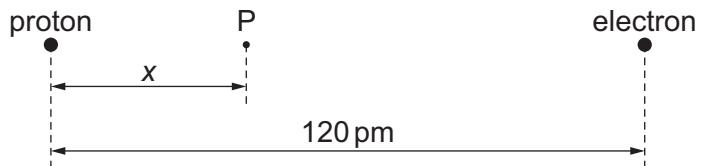


Fig. 5.1

The two particles may be considered as point charges.

Point P lies on the line joining the electron and the proton and is at a variable distance x from the proton.

- (i) Show that the electric potential V at point P when $x = 10 \text{ pm}$ is equal to 130 V.

[2]

- (ii) Calculate, to two significant figures, V when $x = 30 \text{ pm}$.

$$V = \dots \text{ V} [2]$$

- (iii) On Fig. 5.1, draw a cross (\times) at one position, other than infinity, where the electric potential is zero. [1]



(iv) On Fig. 5.2, sketch the variation of V with x between $x = 10\text{ pm}$ and $x = 110\text{ pm}$.

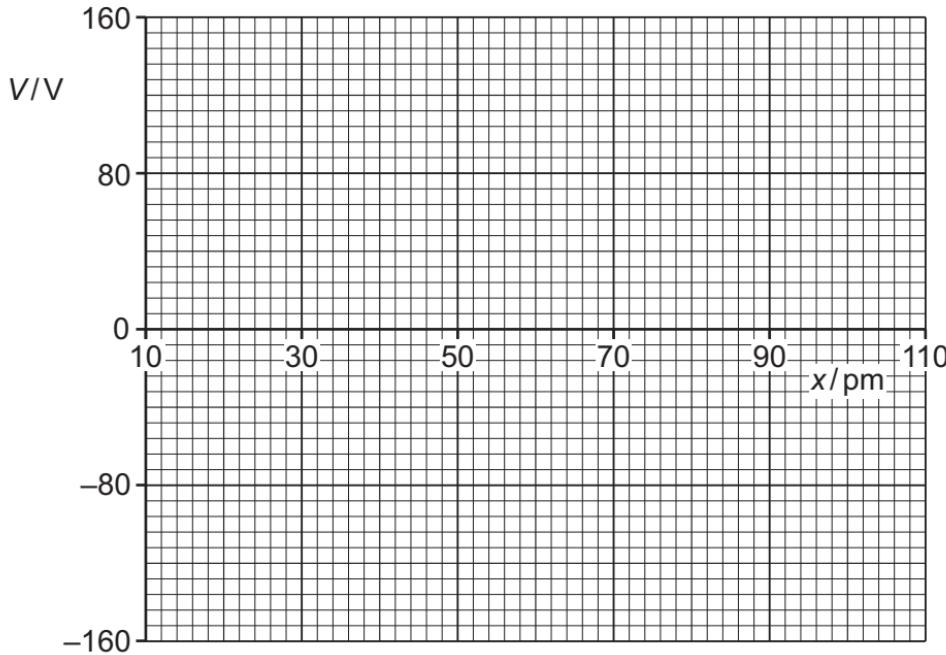


Fig. 5.2

[3]

[Total: 10]