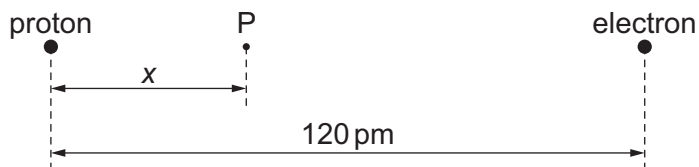


- 5 (a) Define electric potential at a point.

.....  
 .....  
 ..... [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  $x = 10$  pm is equal to 130 V.

[2]

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

$V = \dots\dots\dots$  V [2]

- (iii) On Fig. 5.1, draw a cross (x) 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  $x = 110\text{pm}$ .

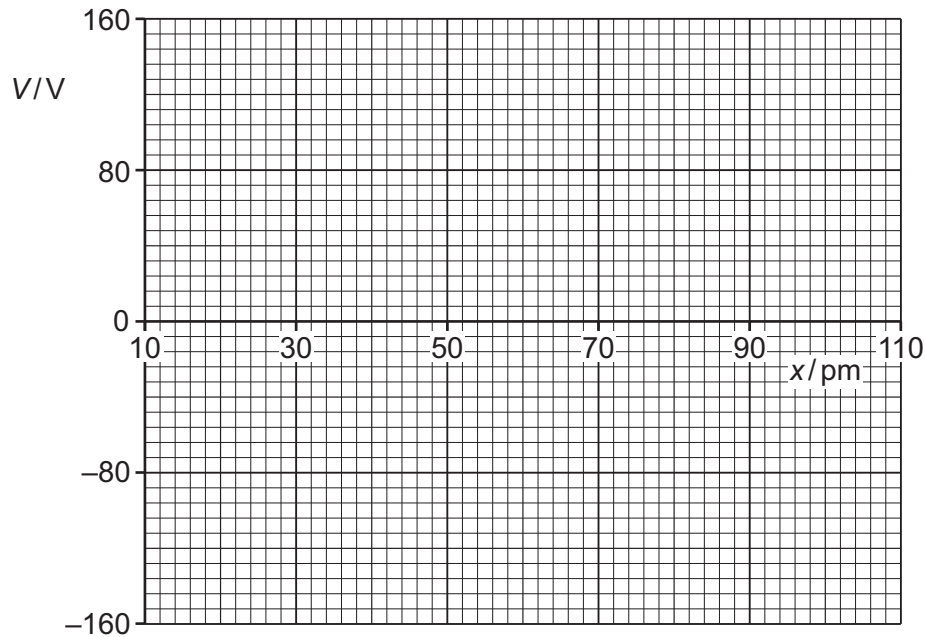


Fig. 5.2

[3]

[Total: 10]