

3]

[Total: 6]

- 3 In a system called the positronium, an electron and positron move in a circular orbit as shown in Fig. 3.1. A positron has a positive elementary charge e and a mass identical to that of an electron. The positron and electron are separated by a distance of 1.30×10^{-10} m.

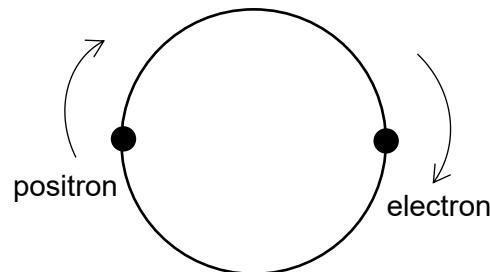


Fig. 3.1

- (a) Explain why the centripetal forces on the electron and positron are equal in magnitude.

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[1]

- (b) Determine

- (i) the magnitude of each centripetal force,

centripetal force = N [2]

(ii) the time taken for one revolution of the electron.

time taken = s [2]

(c) State and explain whether there would be any difference to the circular orbit if it were a proton in place of the positron.

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[2]

[Total: 7]