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5 A particle P_1 is moving with speed v directly towards a second particle P_2. Fig. 5.1 represents P_1 when it is a distance 2.0×10^{-15} m from P_2. The charge on each particle is $+1.6 \times 10^{-19}$ C.

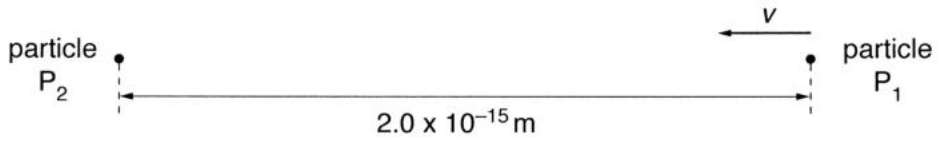

Fig. 5.1

(a) Calculate the electric force between the two particles at this separation.

electric force = ... N [3]

(b) Fig. 5.2 shows the variation with separation x of the electric force F as P_1 moves towards P_2.

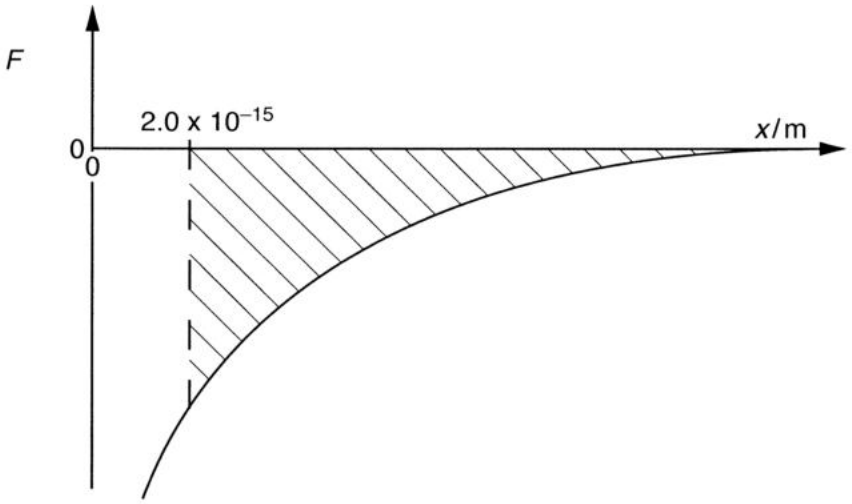

Fig. 5.2

Explain what the shaded area on the graph represents.

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(c) The two particles fuse when they are at a separation of 2.0×10^{-15} m. Explain the energy changes when fusion occurs.

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[Turn over