3 **(a)** State what is meant by *work done*.

.....

.....[1]

(b) A trolley of mass 400 g is moving at a constant velocity of 2.5 m s^{-1} to the right as shown in Fig. 3.1.

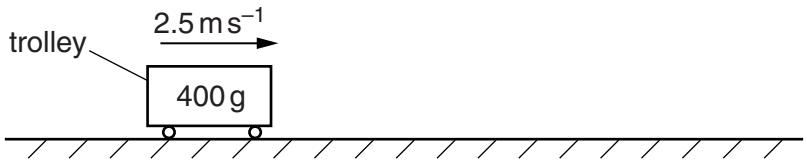

Fig. 3.1

Show that the kinetic energy of the trolley is 1.3 J.

[2]

(c) The trolley in **(b)** moves to point P as shown in Fig. 3.2.

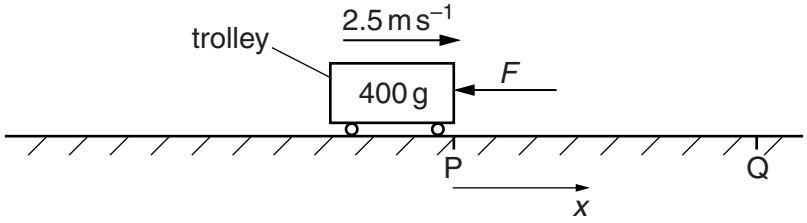

Fig. 3.2

At point P the speed of the trolley is 2.5 m s^{-1}.
A variable force *F* acts to the left on the trolley as it moves between points P and Q.
The variation of *F* with displacement *x* from P is shown in Fig. 3.3.

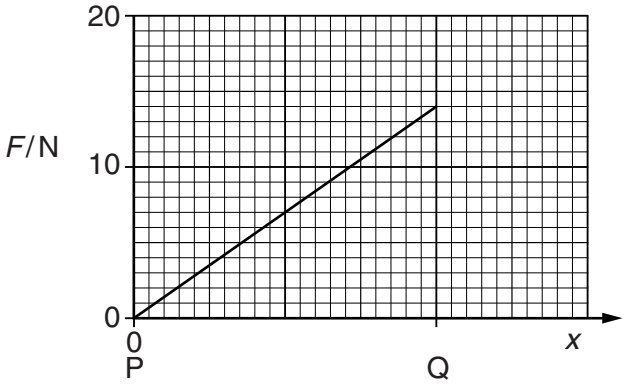

Fig. 3.3

The trolley comes to rest at point Q.

(i) Calculate the distance PQ.

distance PQ = ... m [3]

(ii) On Fig. 3.4, sketch the variation with *x* of velocity *v* for the trolley moving between P and Q.

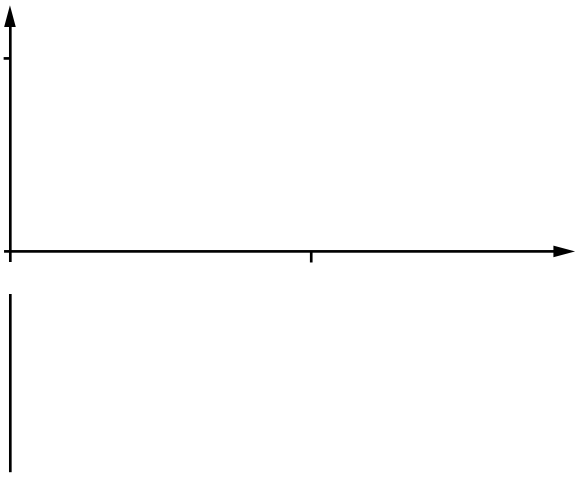

Fig. 3.4

[2]