2

(a)

Define *work done* by a force.

[1]

(b)

A trolley of mass 400 g is moving at a constant speed of 2.5 m s^{-1} to the right as shown in Fig. 2.1.

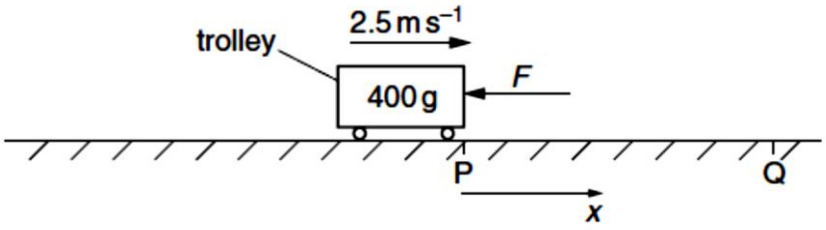

Fig. 2.1

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. 2.2.

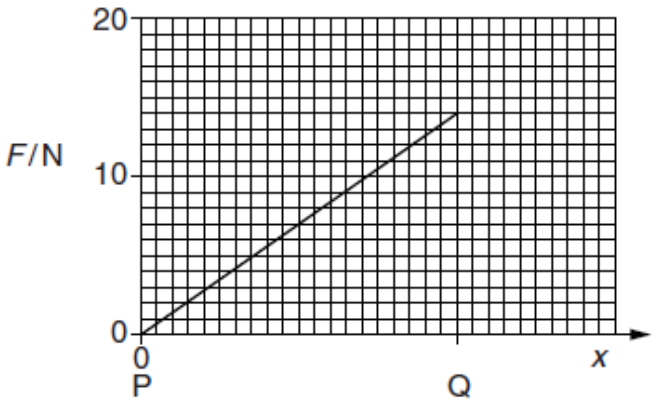

Fig. 2.2

The trolley comes to rest at point Q.

(i)

Calculate the distance PQ.

distance PQ =

m

[2]

(ii)

On Fig. 2.3, sketch the variation with *x* of the work done on trolley by *F*. Indicate on your sketch the maximum value of the work done by *F*.

work done by *F* / J

Fig. 2.3

[2]

(iii)

In order to maintain a constant speed of 2.5 m s^{-1}, an electric motor attached to the trolley is switched on.

On Fig. 2.4, sketch the variation with *x* of the power supplied by motor while the trolley moves from point P to Q. No numerical value is required.

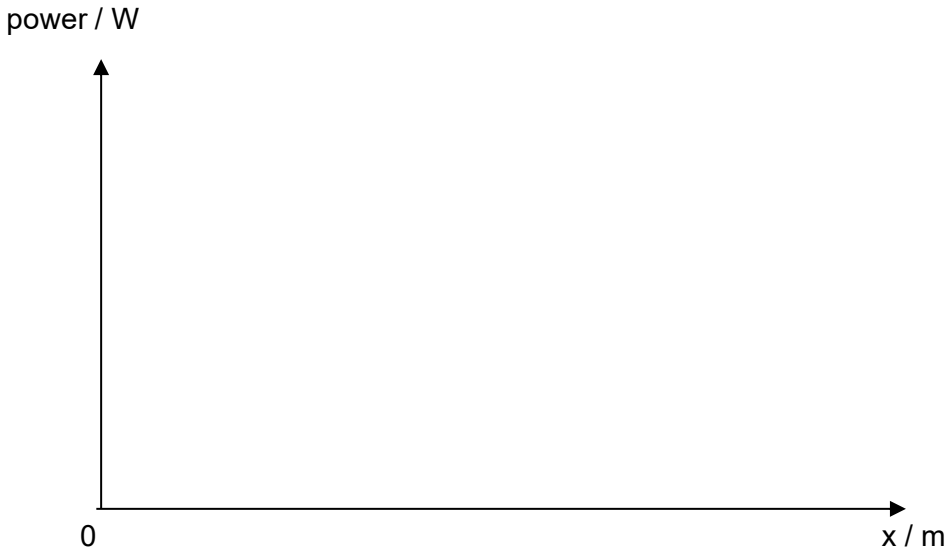

Fig. 2.4

[1]

[Total: 6]