2 **(a)** Define momentum.

.....

..... [1]

(b) A child stands on a scooter on horizontal ground. The combined mass of the child and the scooter is 16 kg.
The child starts from rest and pushes once on the ground with her foot which causes her to accelerate. The push lasts for a time of 1.1 s. The speed of the child and the scooter after the push is 0.60 m s^{-1}.

Determine the average resultant force acting horizontally on the child and the scooter during the push.

average force = ... N [2]

(c) Later, the child in **(b)** travels down a slope at a constant angle to the horizontal, as shown in Fig. 2.1.

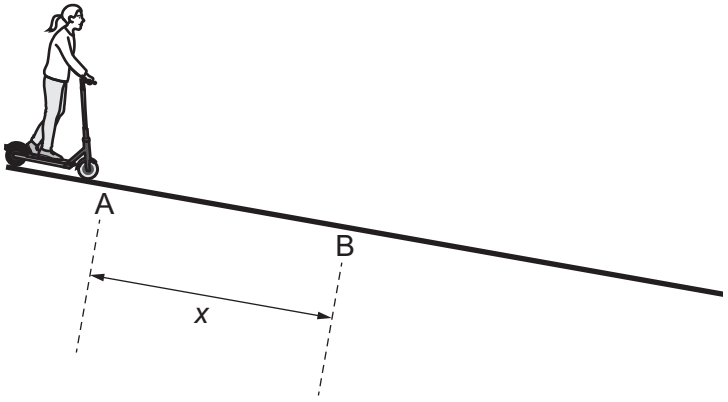

Fig. 2.1 (not to scale)

At point A her speed is 0.60 m s^{-1}. She has a constant acceleration of 0.85 m s^{-2} parallel to the slope. After a time of 3.7 s, she reaches point B.

Calculate the distance x travelled by the child along the slope from A to B.

x = ... m [2]

(d) At point B, the child in **(c)** applies the brake with a constant force to maintain a constant velocity. Point C is 18 m from point B, as shown in Fig. 2.2.

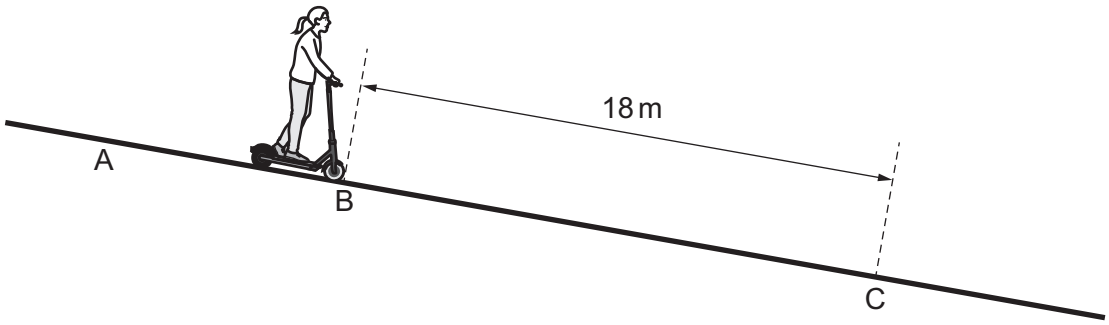

Fig. 2.2 (not to scale)

The work done by the braking force between B and C is 250 J.

(i) Determine the magnitude of the braking force.

force = ... N [2]

(ii) On Fig. 2.3, sketch the variation of the kinetic energy of the child and scooter with distance travelled from point A to point C.
Numerical values for kinetic energy are not required.

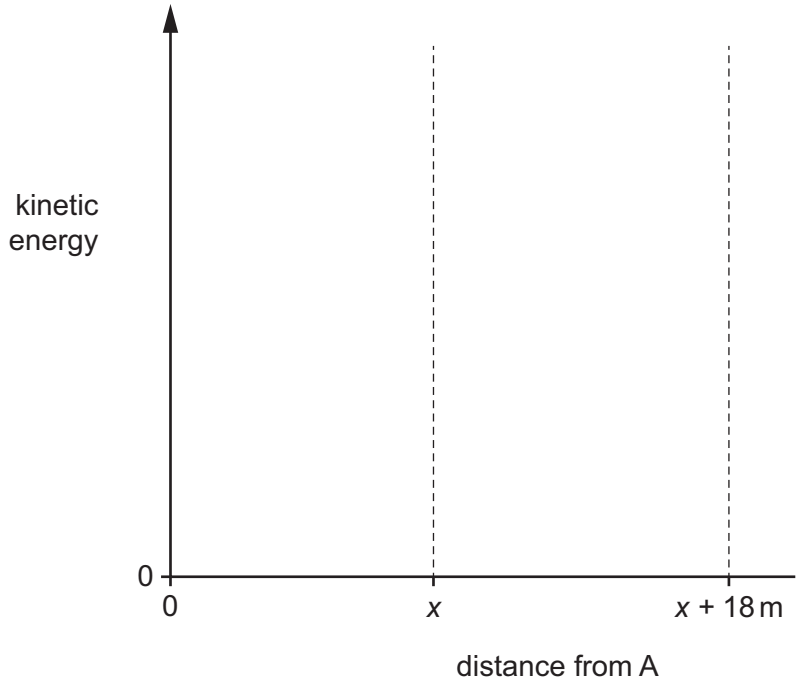

Fig. 2.3

[3]

[Total: 10]