2 A small block is lifted vertically upwards by a toy aircraft, as illustrated in Fig. 2.1.

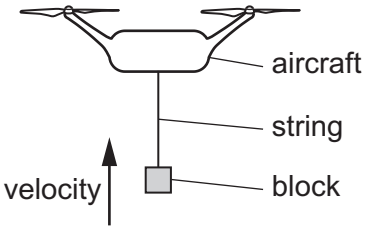

Fig. 2.1

As the block is moving upwards, the string breaks at time $t = 0$. The block initially continues moving upwards and then falls and hits the ground at time $t = 0.90\,s$. The variation with time t of the velocity v of the block is shown in Fig. 2.2.

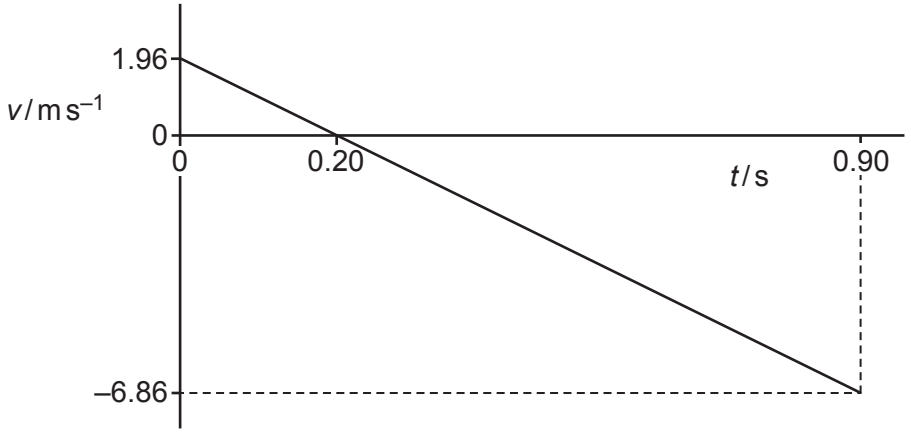

Fig. 2.2

Air resistance is negligible.

(a) State the feature of the graph in Fig. 2.2 that shows the block has a constant acceleration.

..... [1]

(b) Use Fig. 2.2 to determine the height of the block above the ground when the string breaks at time $t = 0$.

height = ... m [3]

(c) The block has a weight of 0.86 N.

Calculate the difference in gravitational potential energy of the block between time $t = 0$ and time $t = 0.90$ s.

difference in gravitational potential energy = ... J [2]

(d) On Fig. 2.3, sketch a line to show the variation of the distance moved by the block with time t from $t = 0$ to $t = 0.20$ s. Numerical values of distance are not required.

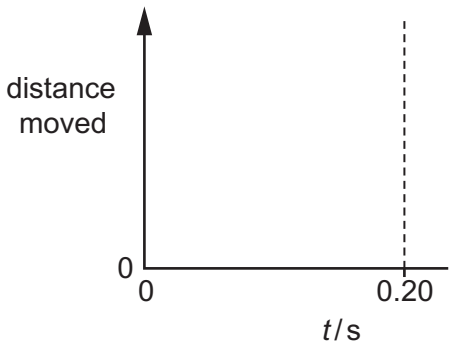

Fig. 2.3

[2]

(e) A block of greater mass is now released from the same height with the same upward velocity. Air resistance is still negligible.

State and explain the effect, if any, of the increased mass on the speed with which the block hits the ground.

.....

..... [1]

[Total: 9]