1 A ball is released from rest at the 80th floor of a very tall building. The height of each floor of the building is 3.0 m and the point of release is 240 m from the ground level as shown in Fig. 1.1.

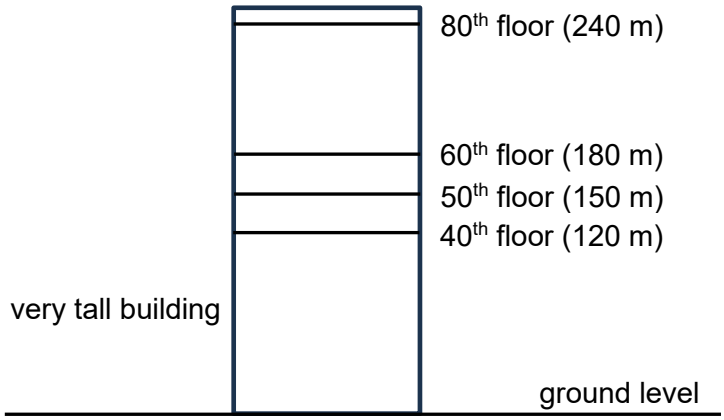

Fig. 1.1

(a) You can assume that air resistance is negligible.

(i) Determine the time taken for the ball to fall from the 60th floor to the 50th floor.

time = ... s [2]

(ii) Explain why the time taken to fall from the 50th floor to the 40th floor is shorter than your answer in **(i)**.

.....

..... [1]

(iii) Determine the speed of the ball when it reaches the ground.

speed = ... m s^{-1} [2]

(b) In practice, air resistance is not negligible. The ball is released from rest at the 80th floor at time $t = 0$. It reaches terminal velocity at $t = t_A$ and hits the ground at $t = t_B$.

On the axes of Fig. 1.2, sketch a graph to show the variation with time t of displacement s from the 80th floor of the ball. Numerical values are not required.

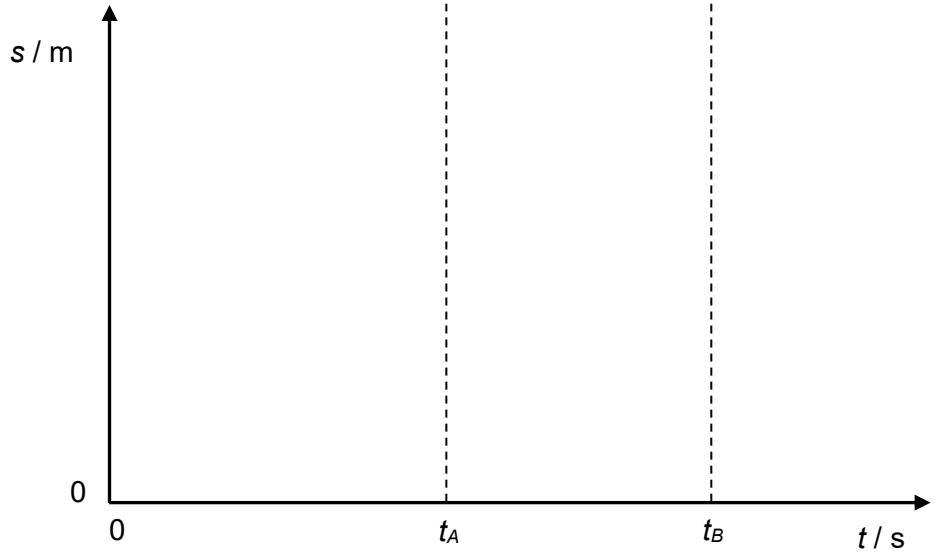

Fig. 1.2

[2]

[Total: 7]