2 An object of mass 1.5 kg is released from a stationary hot air balloon. Fig. 2.1 shows how the vertical displacement of the object varies with time.

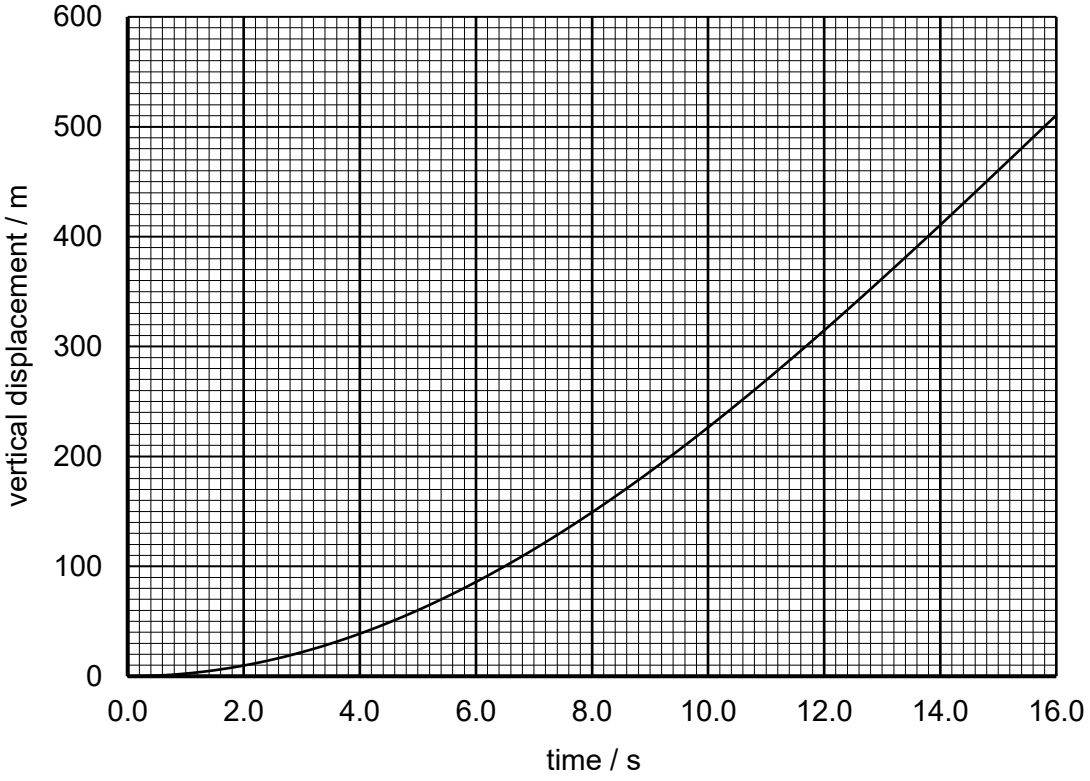

Fig. 2.1

(a) Calculate the change in gravitational potential energy ΔE_p of the object that occurred during the 16 s after it was released.

ΔE_p = ... J [1]

(b) Using Fig. 2.1, determine the speed of the object at t = 16 s.

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

(c) Calculate the change in kinetic energy ΔE_k of the object during the same period.

ΔE_k = ... J [1]

(d) Explain why ΔE_p and ΔE_k are not equal to one another.

…….....……
……

……...……..
[1]

(e) The object strikes the ground 16 s after it was released and penetrates 0.85 m into the ground. Determine the average resistive force acting on the object as it penetrates the ground.

average resistive force = ... N [3]

[Total: 8]