2 Fig. 2.1 shows an object M on a slope.

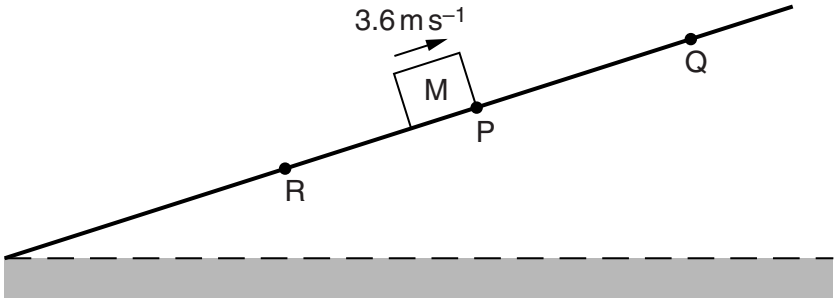

Fig. 2.1

M moves up the slope, comes to rest at point Q and then moves back down the slope to point R.
M has a constant acceleration of $3.0\,m\,s^{-2}$ down the slope at all times.
At time $t = 0$, M is at point P and has a velocity of $3.6\,m\,s^{-1}$ up the slope.
The total distance from P to Q and then to R is 6.0 m.

(a) Calculate, for the motion of M from P to Q,

(i) the time taken,

time = ... s [2]

(ii) the distance travelled.

distance = ... m [1]

(b) Show that the speed of M at R is $4.8\,m\,s^{-1}$.

[2]

(c) On Fig. 2.2, draw the variation with time t of the velocity v of M for the motion P to Q to R.

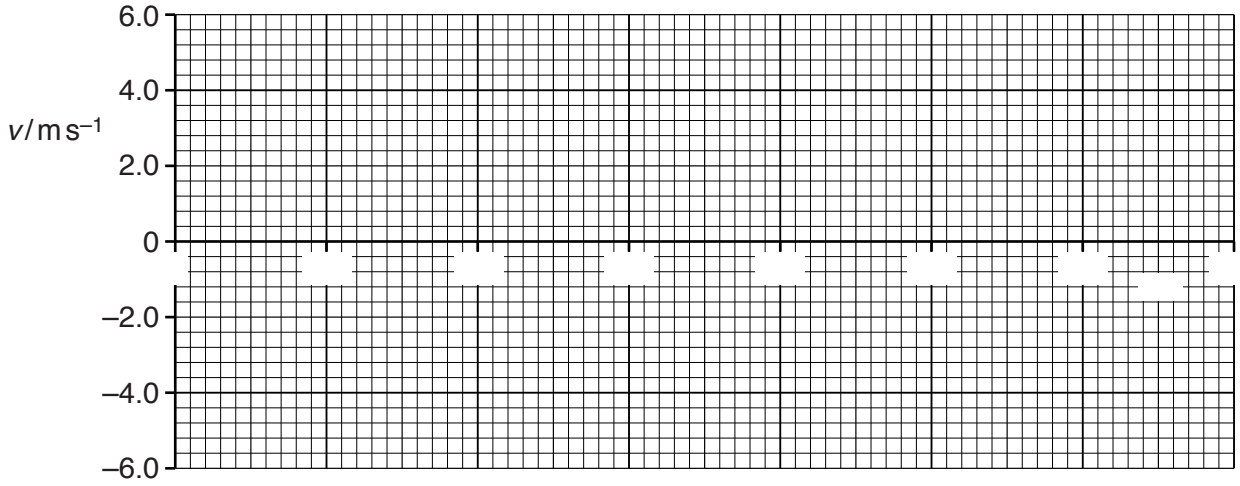

Fig. 2.2

[3]

(d) The mass of M is 450 g.

Calculate the difference in the kinetic energy of M at P and at R.

difference in kinetic energy = ... J [2]