1 **(a)** Explain why it is technically incorrect to define speed as “distance travelled per second”.

Include in your answer the correct definition of speed.

.....

.....

.....

..... [2]

(b) A baseball player throws a ball with an initial speed of 15 m s^{-1} at an angle θ above the horizontal, at a height 2.0 m above the ground. At the maximum height above the ground, the speed of the ball is 7.5 m s^{-1}.

Neglecting air resistance, determine

(i) the angle θ,

θ = ... ° [1]

(ii) the time of flight t_f.

t_f = ... s [3]

(c) **(i)** On Fig. 1.1, sketch the variation with time t of the vertical component of velocity v_y of the ball and label it Q. Mark on the horizontal axis the instant t_1 at which the ball reaches its maximum height.

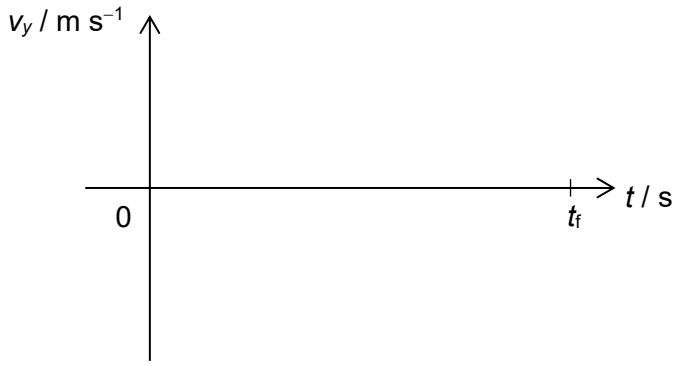

Fig. 1.1

[1]

(ii) If air resistance is not negligible, on Fig. 1.1, sketch the variation with t of v_y for the entire flight and label it R. [3]