1 A ball is thrown with a velocity of 25 m s^{-1} vertically upwards from ground level. Air resistance is not negligible.

The variation with time t of the vertical velocity v of the ball is shown in Fig. 1.1.

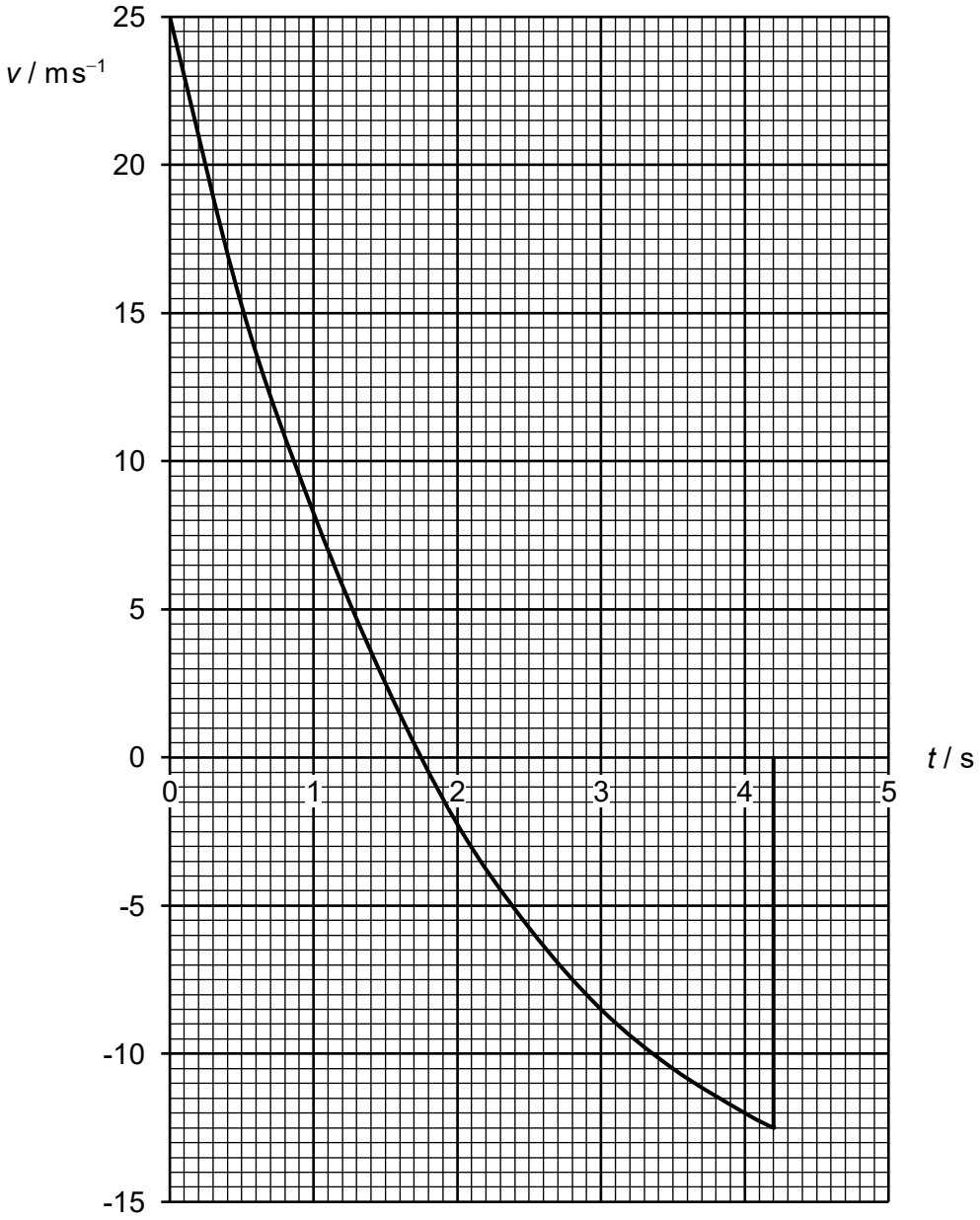

Fig. 1.1

(a) Use Fig. 1.1 to explain how it may be deduced that air resistance varies with speed.

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……..……..……..

……..

[2]

(b) **(i)** State the time at which the acceleration of the ball is *g*.

time = ……... s [1]

(ii) On Fig. 1.1, sketch the graph to show the variation with time *t* of the velocity *v* of the ball if air resistance is negligible.

[2]

(c) The mass of the ball is 350 g and that the maximum height reached by the ball is 19 m.

Use Fig. 1.1 to determine the ratio,

$$\frac{\text{energy lost from the ball due to air resistance during the ball's upward motion}}{\text{energy lost from the ball due to air resistance during the ball's downward motion}}.$$

ratio = …….. [3]

[Total: 8]