1 **(a)** Explain why it is technically incorrect to define speed as distance travelled per second. Include in your answer the correct statement defining speed of an object.

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……..…….....

……..……. [2]

(b) An object is projected at an angle θ to the horizontal from a cliff. It takes the path as shown in Fig. 1.1.

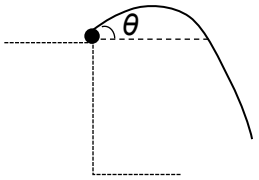

Fig. 1.1 (not drawn to scale)

Fig. 1.2 and Fig. 1.3 shows the variation with time t of the vertical component of its velocity v_y and the horizontal component of its velocity v_x respectively.

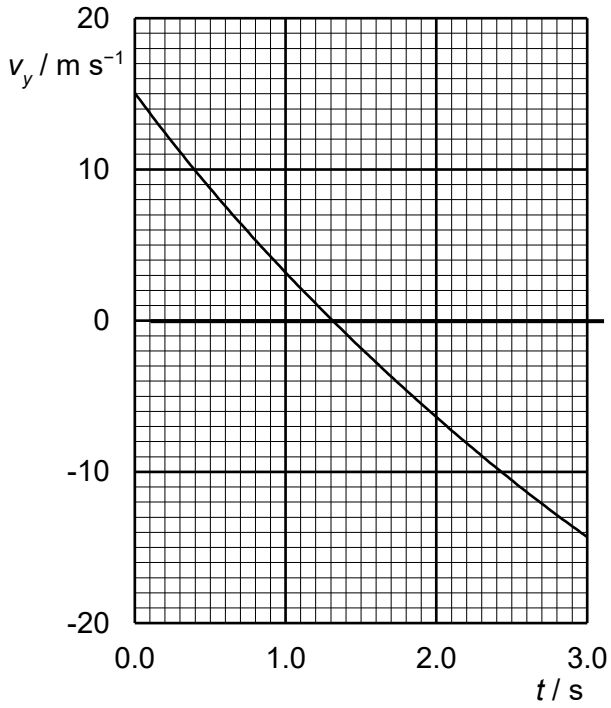

Fig. 1.2

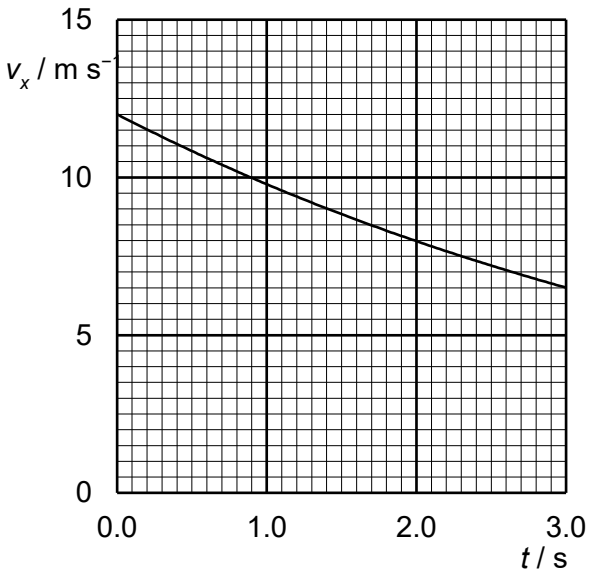

Fig. 1.3

(i) With reference to either Fig. 1.2 or Fig. 1.3, state and explain if the air resistance acting on the object is significant.

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……

…… [2]

(ii) Calculate the angle θ.

θ = …….. ° [2]

(iii) Use Fig. 1.2 to estimate the maximum height reached above the point of projection.

height = …….. m [2]

(c) The net acceleration a_{net} of a falling object of mass m experiencing a drag force D is given by the equation $a_{net} = g - D/m$, where g is the acceleration of freefall.

When dropped together, it is observed that a table tennis ball would reach a slower terminal speed as compared to a stone of the same shape and size. By considering the above equation, or otherwise, explain for this observation.

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……..…….....

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……..……. [2]