2 A skateboarder starts from rest at point A as shown in Fig. 2.1.

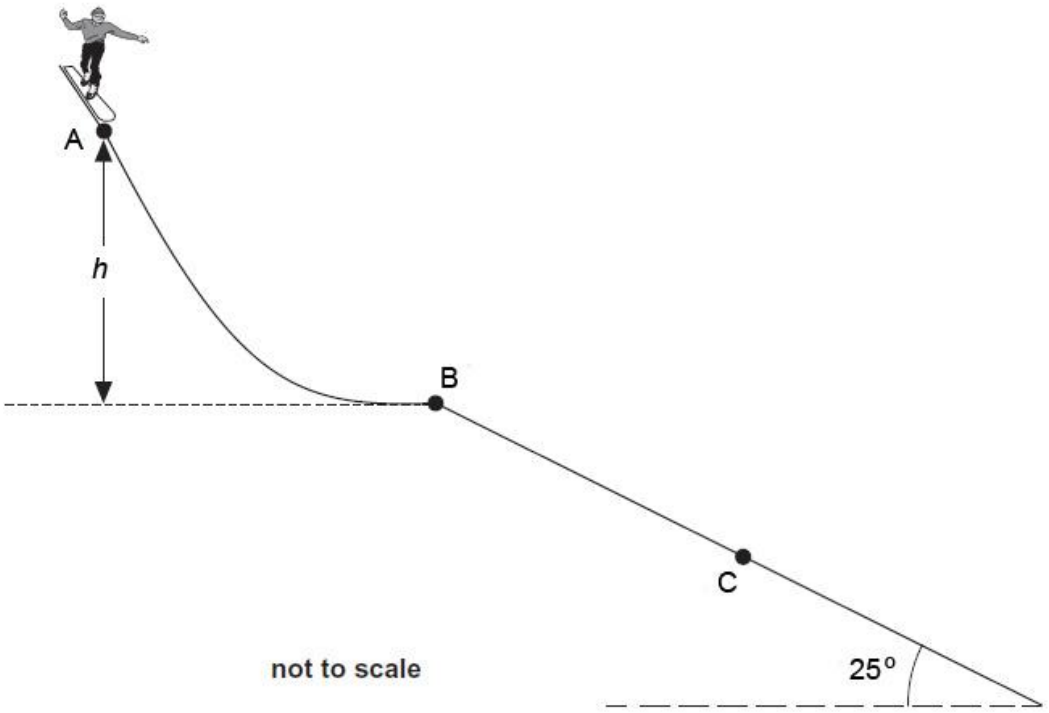

Fig. 2.1

The skateboarder reaches a speed of 17 m s^{-1} at point B.

Consider the skateboarder to be a point mass of 65 kg and ignore the effects of friction and air resistance.

(a) Calculate the height difference, *h*, between point A and point B.

h = ... m [1]

(b) The skateboarder takes off at point B, travelling horizontally with a velocity of 17 m s^{-1}.

He lands at point C after being in the air for 1.6 s.

(i) Calculate v_v, the vertical component of his velocity, just before landing at point C.

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

(ii) On Fig. 2.2, sketch the variation with time of the vertical component of the velocity v_v of the skateboarder from point B to point C.

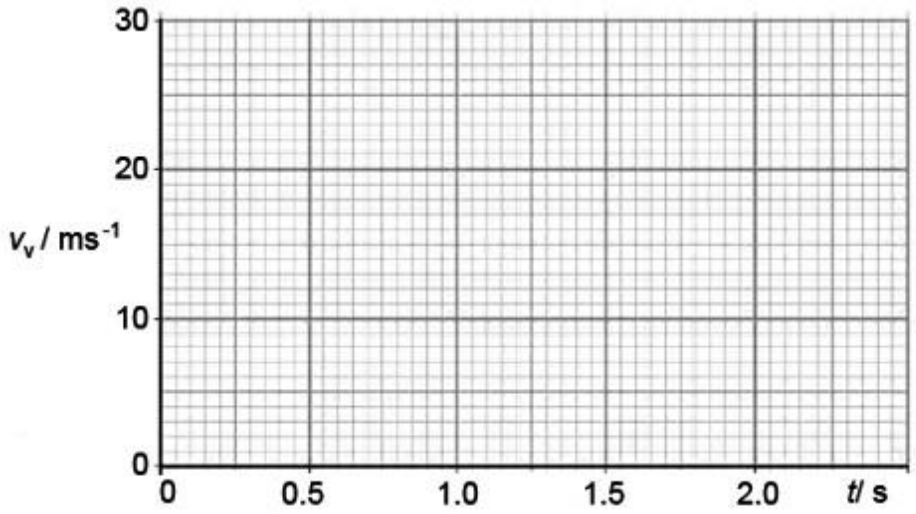

Fig. 2.2 [1]

(iii) Show that the magnitude of the resultant velocity just before landing at point C is 23 m s^{-1}.

[1]

(c) Explain why it is safer for the skateboarder to land on a downward slope than on a horizontal surface.

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..... [2]

[Total: 7]