

Answer all the questions in the spaces provided.

- 1 An object of mass 0.43 kg is launched at an angle of 32° above horizontal ground, as shown in Fig. 1.1.

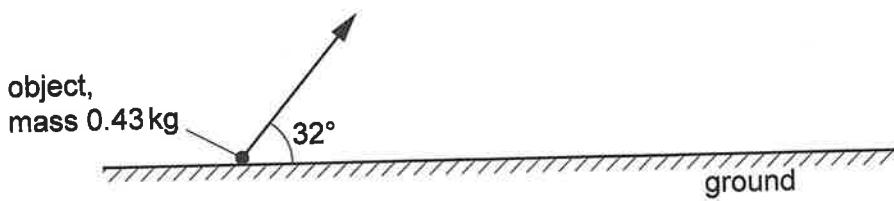


Fig. 1.1

Air resistance is negligible.

- (a) The maximum increase in gravitational potential energy of the object is 27 J.

Calculate the maximum height reached by the object.

$$\text{maximum height} = \dots \text{m} [2]$$

- (b) Show that the vertical component of the initial velocity of the object is 11 m s^{-1} .

[1]





- (c) When the object is at its maximum height, it collides with an object of mass 0.67 kg that is momentarily stationary at the point of collision.

The objects stick together and move with a velocity v .

- (i) Determine the velocity v of the combined object immediately after the collision.

$$v = \dots \text{ ms}^{-1} [4]$$

- (ii) Compare the horizontal distance travelled by the original object as it rises with the horizontal distance travelled by the combined object as it falls.

Explain your answer.

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[2]

[Total: 9]

