1 **(a)** Define acceleration.

.....

..... [1]

(b) A small aircraft is flying horizontally at a speed of $42\,m\,s^{-1}$ at a height of 63 m above horizontal ground, as shown in Fig. 1.1.

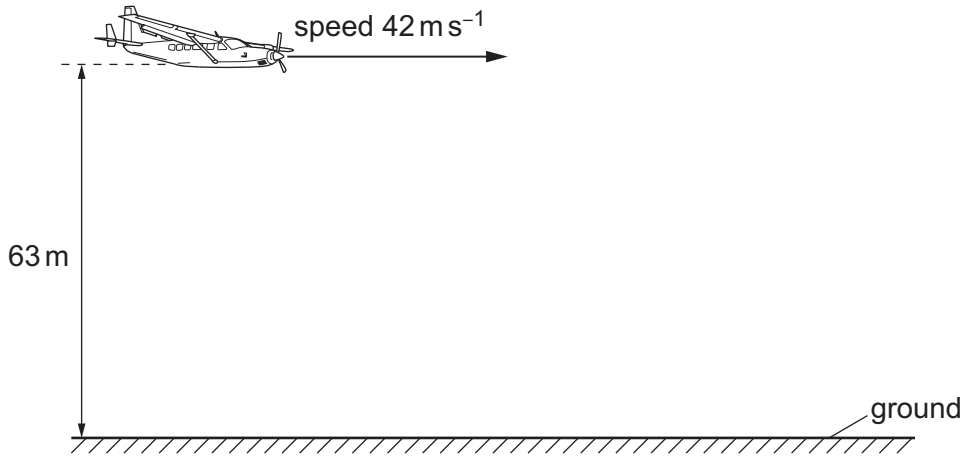

Fig. 1.1

The aircraft drops a small parcel. The parcel is released from the aircraft at the instant shown in Fig. 1.1. Air resistance is negligible.

(i) On Fig. 1.1, draw a line to show the path of the parcel as it falls from the aircraft to the ground. [1]

(ii) Calculate the time taken from the instant of release to the instant the parcel reaches the ground.

time = ... s [2]

(iii) Calculate the vertical component of the velocity of the parcel immediately before it reaches the ground.

vertical component of velocity = ... $m\,s^{-1}$ [1]

(iv) Determine the speed at which the parcel reaches the ground.

speed = ... $m\,s^{-1}$ [2]

[Total: 7]