5. A parachute is used to deliver a box of supplies. The parachute is attached to the box.

- the parachute and box are dropped from rest from a helicopter that is hovering at a height of 520 m above the ground
- the parachute and box fall vertically and freely under gravity for 5 seconds, then the parachute opens
- from the instant the parachute opens, it provides a resistance to motion of magnitude 3200 N
- the parachute and box continue to fall vertically downwards after the parachute opens
- the parachute and box are modelled throughout the motion as a particle P of mass 250 kg

(a) Find the distance fallen by P in the first 5 seconds.

(2)

(b) Find the speed with which P lands on the ground.

(7)

(c) Find the total time from the instant when P is dropped from the helicopter to the instant when P lands on the ground.

(3)

(d) Sketch a speed-time graph for the motion of P from the instant when P is dropped from the helicopter to the instant when P lands on the ground.

(2)

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Question 5 continued

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Question 5 continued

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