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7. A helicopter is hovering at rest above horizontal ground at the point H . A parachutist steps out of the helicopter and immediately falls vertically and freely under gravity from rest for 2.5 s. His parachute then opens and causes him to immediately decelerate at a constant rate of 3.9 m s^{-2} for T seconds ($T < 6$), until his speed is reduced to $V \text{ m s}^{-1}$. He then moves with this constant speed $V \text{ m s}^{-1}$ until he hits the ground. While he is decelerating, he falls a distance of 73.75 m. The total time between the instant when he leaves H and the instant when he hits the ground is 20 s.

The parachutist is modelled as a particle.

- (a) Find the speed of the parachutist at the instant when his parachute opens. (1)

(b) Sketch a speed-time graph for the motion of the parachutist from the instant when he leaves H to the instant when he hits the ground. (2)

(c) Find the value of T . (5)

(d) Find, to the nearest metre, the height of the point H above the ground. (4)

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