Solution 1

(4 marks)

A runway at a small airport is 1220 m long. A light aircraft accelerates at 0.785 m s^{-2} along this runway, starting at one end and taking off 200 m before reaching the other end. If the aircraft was initially stationary, calculate its speed when it took off. Show **all** workings, and give the appropriate unit.

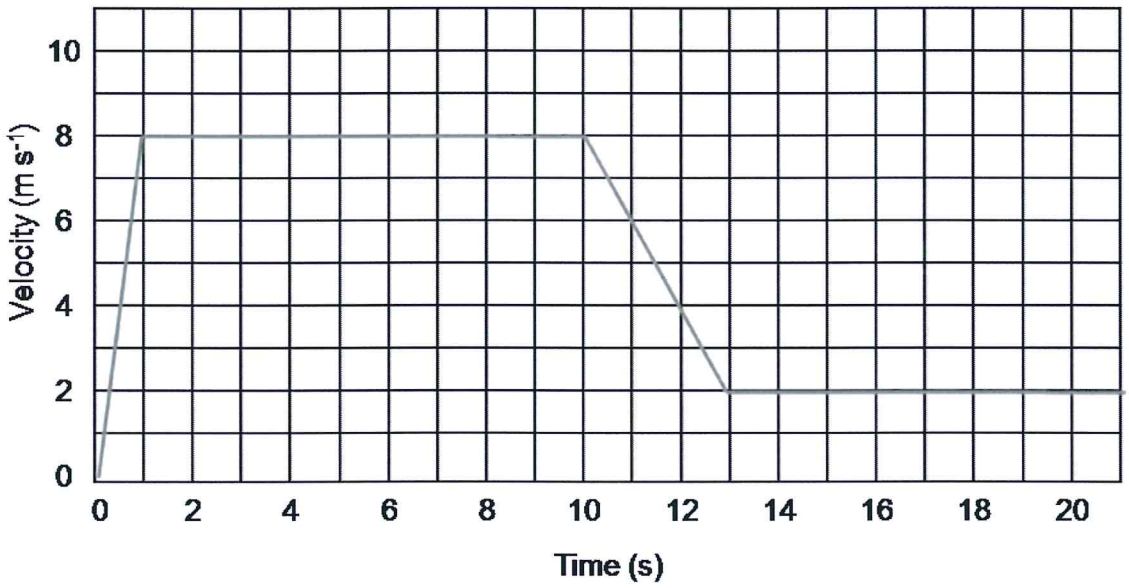
description	Marks
s = 1220 – 200 = 1020 m	1
$v^2 = u^2 + 2as$ $v^2 = 0 + (2 \times 0.785 \times 1020) = 1601.4$	1
v = 40.0	1
m s^{-1}	1
Total	**4**

Solution 2

(5 marks)

Jill begins from rest and after 1.0 s is moving at a velocity of 8.0 m s^{-1} for 9.0 s. She then takes 3.0 s to slow down to 2.0 m s^{-1} and continues at this velocity.

(a) Graph Jill's motion on the velocity time graph below from the information given above. (2 marks)



Description	Marks
Times are appropriately spaced (x-coordinates)	1
magnitudes correct (y-coordinates)	1
Total	**2**

(b) Calculate Jill's acceleration between the 10th and the 13th second. (3 marks)

Description	Marks
a = (v-u)/t =(2.0-8.0)/3.0	1
a = -2.0 m s^{-2}	1
(direction e.g. opposite to motion or negative)	1
Total	**3**