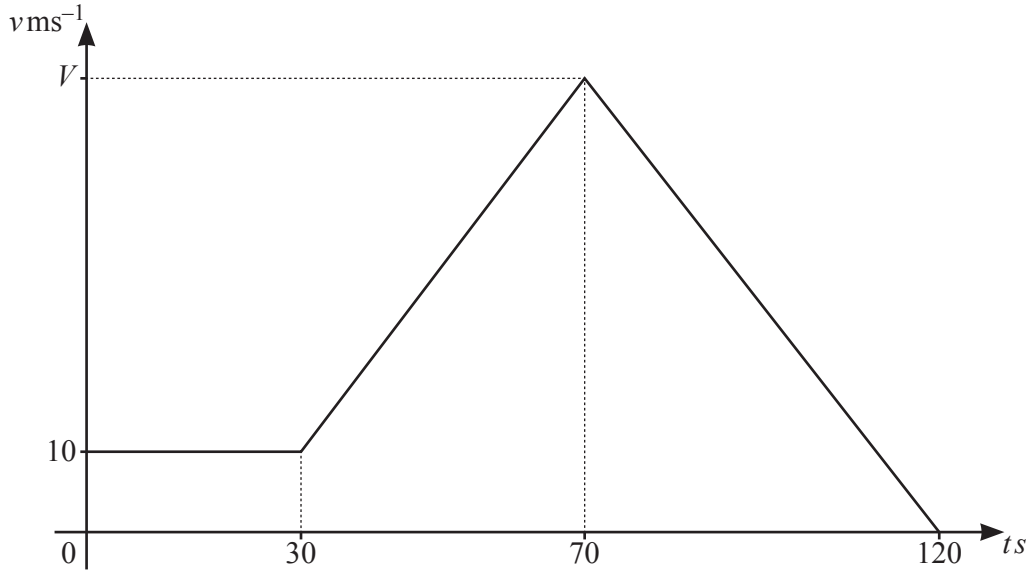
6 In this question all distances are in metres and all times are in seconds.

(a)



(i) The diagram shows the velocity–time (v–t) graph of a particle travelling in a straight line. The particle travels a distance of 2750 m in 120 s. Find the velocity, V, of the particle when $t = 70$. [2]

(ii) Find the acceleration of the particle for $70 < t < 120$. [2]

(b) A different particle moves in a straight line such that its velocity, v ms^{-1}, t seconds after leaving a fixed point O, is given by $v = t\left(t^2 + 5\right)^{\frac{1}{2}}$.

(i) Find the exact acceleration of the particle when $t = 2$. [4]

(ii) Explain why the particle does not change direction for $t > 0$. [1]

7 **(a)** Find $\int_2^4 (5x-2)^{-\frac{2}{3}}\,\mathrm{d}x$, giving your answer in exact form. [4]

(b) Find $\int_0^{\frac{1}{2}}\left(\frac{4}{2x+1}+\frac{8}{(2x+1)^2}\right)\mathrm{d}x$, giving your answer in the form $a+\ln b$, where a and b are integers. [5]

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