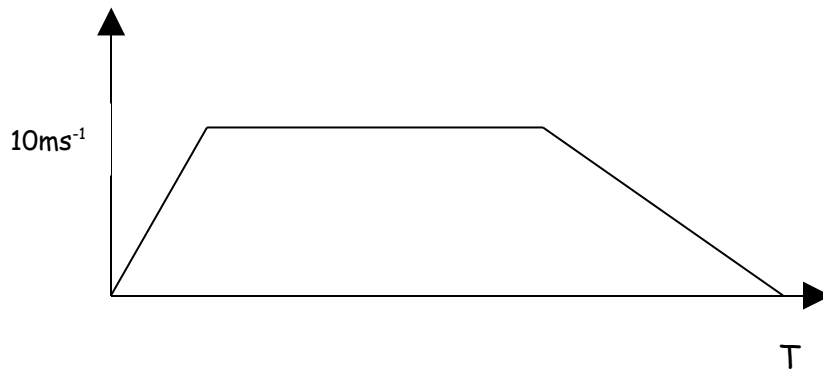


Kinematics

Questions B

1 The diagram shows the sketch of a velocity time graph for a particle moving in a straight line. Find the value of T given that:



- a) the distance covered is 100m.
 - b) the constant speed attained by the particle is 10ms^{-1}
 - c) the rate of acceleration is twice the rate of retardation.
 - d) The time spent at constant speed is equal to the total time spent accelerating and decelerating.
- 2 Two trains, P and Q, run on parallel straight tracks. Initially both trains are at rest. At time $t = 0$, P moves off with constant acceleration for 15 seconds until it reaches a speed of 30ms^{-1} . P then continues at a constant speed. At time $t = 35$ seconds Q moves off with the same acceleration until it reaches a speed of 55ms^{-1} . Q then continues at this constant speed. Train Q overtakes P whilst both trains are travelling at constant speeds after time T . Sketch a speed time graph for the journeys and find the value of T .

3 A particle Q starts from rest at a point O and accelerates at 3ms^{-2} until it reaches a speed $V\text{ms}^{-2}$. Q then continues at the constant speed for 90 seconds before decelerating at 1.5ms^{-2} to come to rest at the point R. If the entire journey takes 150 seconds find the distance QR. Make sure that you draw a speed time graph.

4 A racing car moves in a straight line. The car accelerates at 8ms^{-2} for 5 seconds, maintains a steady speed for 15 seconds and then decelerates to rest in 9 seconds. Sketch a velocity time graph for the car and calculate the total distance travelled.