

Constant acceleration



Gold

A particle passes the origin O with a velocity of 4 m s^{-1} and accelerates along the positive x -axis with an acceleration of 4 m s^{-2} . Five seconds later a second particle sets out from rest from O and travels along the positive x -axis with an acceleration of 10 m s^{-2} . Find how far from O the second particle overtakes the first particle giving your answer to the nearest metre.

Silver

A car is moving along a straight road PQR with uniform acceleration $a \text{ m s}^{-2}$. The distance PQ is 95 m. The time taken by the car to travel from P to Q is 5 s and the time taken to travel from Q to R is 2 s. At P the speed of the car is $u \text{ m s}^{-1}$ and at R , its speed is 29.8 m s^{-1} .

- a** Draw a velocity-time graph to show the motion of the car
- b** Find the value of u in m s^{-1}
- c** Find the value of the acceleration a in m s^{-2}

Bronze

A particle sets out from the origin in a straight line with a velocity of $u \text{ m s}^{-1}$ and accelerates for 10 seconds until it reaches a velocity of 4 m s^{-1} . It then maintains this constant velocity for 10 seconds until it decelerates to rest in 5 s. The total distance travelled by the particle is 80 m.

- a** Sketch a velocity-time graph to show the motion of the particle.
- b** Find the value of u .
- c** Find the deceleration of the particle.