

Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

2 Kinematics in one dimension

Exercise A, Question 13

Question:

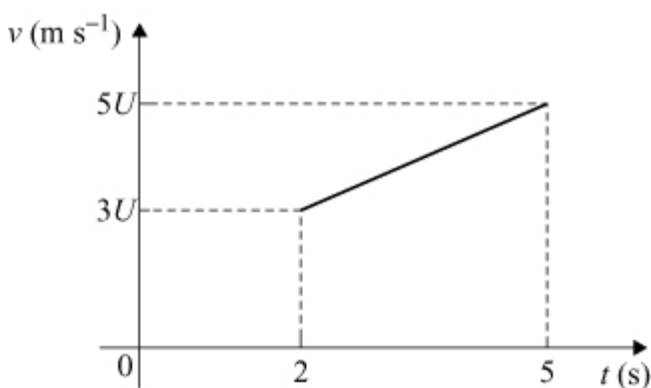
The velocity-time graph shows the motion of a particle P moving with constant acceleration. At times $t = 2$ and $t = 5$, P has velocities $3U$ and $5U$, respectively.

(a) (i) Find, in terms of U , the acceleration of P .

(ii) Find, in terms of U , the distance travelled by P between the times $t = 2$ and $t = 5$.

(b) When $t = 5$, the motion of P changes and subsequently P moves with constant retardation. The particle P comes to rest after travelling a **further** 20 metres in the next 4 seconds.

Find the value of U . [A]



Solution:

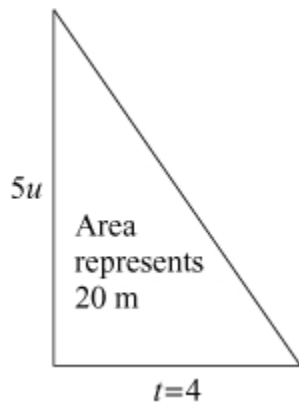
$$(a) \text{ (i) Acceleration} = \frac{(5U - 3U)}{(5 - 2)} = \frac{2U}{3} \text{ m s}^{-2}$$

$$(ii) \text{ Distance travelled} = \frac{(3U + 5U)}{2} \times (5 - 2) = 4U \times 3 \\ = 12U \text{ metres}$$

$$\frac{1}{2} \times 4 \times 5U = 20$$

$$(b) \therefore 10U = 20$$

$$U = 2 \text{ m s}^{-1}$$



© Harcourt Education Ltd 2005