

爱德思
Mechanics 3
分类真题
2014-2022 册

A Level Clouds 出品

目录

Chapter 1 Kinematics	1
Chapter 2 Elastic Strings and Springs	12
Chapter 3 Dynamics	55
Chapter 4 Circular Motion	136
Chapter 5 Centres of Mass and Statics of Rigid Bodies	222

Chapter 1

Kinematics

3. At time $t = 0$, a particle P is at the origin O , moving with speed 8 m s^{-1} in the positive x direction. At time t seconds, $t \geq 0$, the acceleration of P has magnitude $2(t + 4)^{-\frac{1}{2}} \text{ ms}^{-2}$ and is directed towards O .

(a) Show that, at time t seconds, the velocity of P is $16 - 4(t + 4)^{\frac{1}{2}} \text{ ms}^{-1}$

(5)

(b) Find the distance of P from O when P comes to instantaneous rest.

(7)

Leave
blank

2. A particle P is moving in a straight line. At time t seconds, the distance of P from a fixed point O on the line is x metres and the acceleration of P is $(6 - 2t)$ m s $^{-2}$ in the direction of x increasing. When $t = 0$, P is moving towards O with speed 8 m s $^{-1}$

(a) Find the velocity of P in terms of t .

(3)

(b) Find the total distance travelled by P in the first 4 seconds.

(5)

Leave
blank

1. A particle P moves on the x -axis. At time t seconds, $t \geq 0$, the displacement of P from the origin O is x metres and the acceleration of P is $\left(\frac{7}{2} - 2x\right) \text{ m s}^{-2}$, measured in the positive x direction. At time $t = 0$, P passes through O moving with speed 3 m s^{-1} in the positive x direction. Find the distance of P from O when P first comes to instantaneous rest.

(6)

Leave
blank

3. A particle P is moving along the x -axis. At time t seconds, where $t \geq 0$, P is x metres from the origin O and is moving with speed $v \text{ ms}^{-1}$

The acceleration of P has magnitude $\frac{2}{(2x+1)^3} \text{ ms}^{-2}$ and is directed towards O


When $t = 0$, P passes through O in the positive x direction with speed 1 ms^{-1}

(a) Find v in terms of x

(4)

(b) Show that $x = \frac{1}{2}(\sqrt{(4t+1)} - 1)$

(4)



3.

In this question you must show all stages of your working.

Solutions relying entirely on calculator technology are not acceptable.

A particle P is moving along a straight line.

At time t seconds, P is a distance x metres from a fixed point O on the line and is

moving away from O with speed $\frac{50}{2x+3} \text{ m s}^{-1}$

(a) Find the deceleration of P when $x = 12$

(5)

Given that $x = 4$ when $t = 1$

(b) find the value of t when $x = 12$

(5)