



Constant Acceleration : Vertical Motion - Edexcel Past Exam Questions

1. A stone is thrown vertically upwards with speed 16 m s^{-1} from a point h metres above the ground. The stone hits the ground 4 s later. Find
- (a) the value of h , (3)
- (b) the speed of the stone as it hits the ground. (3)

Jan 06 Q1

2. A ball is projected vertically upwards with speed 21 m s^{-1} from a point A , which is 1.5 m above the ground. After projection, the ball moves freely under gravity until it reaches the ground. Modelling the ball as a particle, find
- (a) the greatest height above A reached by the ball, (3)
- (b) the speed of the ball as it reaches the ground, (3)
- (c) the time between the instant when the ball is projected from A and the instant when the ball reaches the ground. (4)

Jan 07 Q5

3. A firework rocket starts from rest at ground level and moves vertically. In the first 3 s of its motion, the rocket rises 27 m . The rocket is modelled as a particle moving with constant acceleration $a \text{ m s}^{-2}$. Find
- (a) the value of a , (2)
- (b) the speed of the rocket 3 s after it has left the ground. (2)

After 3 s , the rocket burns out. The motion of the rocket is now modelled as that of a particle moving freely under gravity.

- (c) Find the height of the rocket above the ground 5 s after it has left the ground. (4)

Jan 08 Q2

4. At time $t = 0$, a particle is projected vertically upwards with speed $u \text{ m s}^{-1}$ from a point 10 m above the ground. At time T seconds, the particle hits the ground with speed 17.5 m s^{-1} . Find
- (a) the value of u , (3)
- (b) the value of T (4)

June 08 Q2



5. A ball is projected vertically upwards with a speed of 14.7 m s^{-1} from a point which is 49 m above horizontal ground. Modelling the ball as a particle moving freely under gravity, find
- (a) the greatest height, above the ground, reached by the ball, (4)
 - (b) the speed with which the ball first strikes the ground, (3)
 - (c) the total time from when the ball is projected to when it first strikes the ground. (3)

June 10 Q6

6. A ball is thrown vertically upwards with speed $u \text{ m s}^{-1}$ from a point P at height h metres above the ground. The ball hits the ground 0.75 s later. The speed of the ball immediately before it hits the ground is 6.45 m s^{-1} . The ball is modelled as a particle.
- (a) Show that $u = 0.9$. (3)
 - (b) Find the height above P to which the ball rises before it starts to fall towards the ground again. (2)
 - (c) Find the value of h . (3)

Jan 11 Q2
