Exam Style Questions – Constant Acceleration

The following information relates to questions 1 and 2.

In order to overtake a car on the freeway, the driver of a car speeds from 85 km h^{-1} to 100 km h^{-1} at a rate of 1.5 m s^{-2}.

1. How long does it take for the car to reach its final speed?

s

2 marks

2. How far does it travel in this acceleration period?

m

2 marks

The following information relates to questions 3 and 4.

A biker decelerates at 5.5 m s^{-2} for 2.0 s until coming to rest.

3. What was the initial speed of the biker?

m s^{-1}

2 marks

4. How far did the biker travel whilst braking?

m

2 marks

The following information relates to questions 5 and 6.

Arthur rolls a ball off the edge of a 90 m high cliff. Assume the ball falls straight down and air resistance is negligible.

5. What is the speed of the ball when it hits the ground below?

m s^{-1}

2 marks

6. How long does it take for the ball to hit the ground?

s

2 marks

Challenge Question:

The following information relates to questions 7 and 9.

Stephanie stands on the edge of a building with two golf balls. She throws one of the balls straight up in the air with an initial speed of 17 m s^{-1}. Steph watches as the ball reaches its maximum height and starts its descent towards the ground. When the ball is exactly half way between this apex and the building (on the way down), Steph drops the second the ball. Assume that air resistance is negligible and that Steph throws and drops the respective balls level with the top of the building.

7. What is the maximum height of the first golf ball from the top of the building?

m

2 marks

8. What is the speed of the first ball when it is half way between its maximum height and the top of the building?

m s^{-1}

2 marks

9. Steph notices that the balls hit the ground at the same time. Calculate the height of the building.

m

4 marks