

CSD2301 Practice

## **2. Kinematics in 1D**

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# Practice Question 1

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A brick is dropped (zero initial speed) from the roof of a building. The brick strikes the ground in 2.50 s. You may ignore air resistance, so the brick is in free fall.

- a) How tall, in meters, is the building?
- b) What is the magnitude of the brick's velocity just before it reaches the ground?
- c) Sketch the  $y$ - $t$ ,  $v_y$ - $t$  and  $a_y$ - $t$  graphs for the motion of the brick.

## Practice Question 2

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An antelope moving with constant acceleration covers the distance between two points 70.0 m apart in 7.00 s. Its speed as it passes the second point is 15.0 m/s. (a) What is its speed at the first point? (b) What is its acceleration?



## Practice Question 3

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A rocket carrying a satellite is accelerating straight up from the earth's surface. At 1.15 s after liftoff, the rocket is 63 m above the ground. After an additional 4.75 s, it is 1.00 km above the ground. Calculate the magnitude of the average velocity of the rocket for (a) the 4.75 s part of its flight and (b) the first 5.90 s of its flight.

# Practice Question 4

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In the fastest measured tennis serve, the ball left the racquet at  $73.14 \text{ m/s}$ . A served tennis ball is typically in contact with the racquet for  $30.0 \text{ ms}$  and starts from rest. Assume constant acceleration. (a) What was the ball's acceleration during this serve? (b) How far did the ball travel during the serve?



# Practice Question 5

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(a) If a flea can jump straight up to a height of  $0.440\text{ m}$ , what is its initial speed as it leaves the ground? (b) How long is it in the air?

# Practice Question 6

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A baseball left a pitcher's hand at a speed of  $45.0 \text{ m/s}$ . If the pitcher was in contact with the ball over a distance of  $1.50 \text{ m}$  and produced constant acceleration, (a) what acceleration did he give the ball, and (b) how much time did it take him to pitch it?



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The End