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Chapter: 1-Dimension & Free Fall Motion (EE117)

Worksheet # 03

Q1. A car traveling 56.0 km/h is 24.0 m from a barrier when the driver slams on the brakes. The car hits the barrier 2.00 s later. (a) What is the magnitude of the car's constant acceleration before impact? (b) How fast is the car traveling at impact?

Q2. A hot-air balloon is ascending at the rate of 12 m/s and is 80 m above the ground when a package is dropped over the side.

- (a) How long does the package take to reach the ground?
- (b) With what speed does it hit the ground?

Q3. (a) With what speed must a ball be thrown vertically from ground level to rise to a maximum height of 50 m?

(b) How long will it be in the air?

(c) Sketch graphs of y , v , and a versus t for the ball. On the first two graphs, indicate the time at which 50 m is reached.

Q4. A ball of moist clay falls 15.0 m to the ground. It is in contact with the ground for 20.0 ms before stopping.

- (a) What is the magnitude of the average acceleration of the ball during the time it is in contact with the ground? (Treat the ball as a particle.)
- (b) Is the average acceleration up or down?

Q5. A rock is thrown vertically upward from ground level at time $t = 0$. At $t = 1.5$ s it passes the top of a tall tower, and 1.0 s later it reaches its maximum height. What is the height of the tower?

Q6. A golf ball is released from rest from the top of a very tall building. Neglecting air resistance, calculate (a) the position and (b) the velocity of the ball after 1.00, 2.00, and 3.00 s.

Q7. A ball is thrown directly downward, with an initial speed of 8.00 m/s, from a height of 30.0 m. After what time interval does the ball strike the ground?

Q8. A student throws a set of keys vertically upward to her sorority sister, who is in a window 4.00 m above. The keys are caught 1.50 s later by the sister's outstretched hand.

- (a) With what initial velocity were the keys thrown?
- (b) What was the velocity of the keys just before they were caught?