1) An airplane accelerates down a runway at 3.20 m/s^2 for 32.8 s until is finally lifts off the ground. Determine the distance traveled before takeoff. **d = 1720 m**

2) A car starts from rest and accelerates uniformly over a time of 5.21 seconds for a distance of 110 m. Determine the acceleration of the car. **a = 8.10 m/s^2**

3) Upton Chuck is riding the Giant Drop at Great America. If Upton free falls for 2.60 seconds, what will be his final velocity and how far will he fall? **d = -33.1 m** (- indicates direction)

4) A race car accelerates uniformly from 18.5 m/s to 46.1 m/s in 2.47 seconds. Determine the acceleration of the car and the distance traveled. **a = 11.2 m/s^2 ; d = 79.8 m**

5) A feather is dropped on the moon from a height of 1.40 meters. The acceleration of gravity on the moon is 1.67 m/s^2. Determine the time for the feather to fall to the surface of the moon. **t = 1.29 s**

6) Rocket-powered sleds are used to test the human response to acceleration. If a rocket-powered sled is accelerated to a speed of 444 m/s in 1.83 seconds, then what is the acceleration and what is the distance that the sled travels? **a = 243 m/s^2 ; d = 406 m**

7) A bike accelerates uniformly from rest to a speed of 7.10 m/s over a distance of 35.4 m. Determine the acceleration of the bike. **a = 0.712 m/s^2**

8) An engineer is designing the runway for an airport. Of the planes that will use the airport, the lowest acceleration rate is likely to be 3 m/s^2. **d = 704 m**

9) A car traveling at 22.4 m/s skids to a stop in 2.55 s. Determine the skidding distance of the car (assume uniform acceleration). **d = 28.6 m**

10) A kangaroo is capable of jumping to a height of 2.62 m. Determine the takeoff speed of the kangaroo. **Vi = 7.17 m/s**

11) If Michael Jordan has a vertical leap of 1.29 m, then what is his takeoff speed and his hang time (total time to move upwards to the peak and then return to the ground)? **Vi = 5.03 m/s ; hang time = 1.03 s**

12) A bullet leaves a rifle with a muzzle velocity of 521 m/s. While accelerating through the barrel of the rifle, the bullet moves a distance of 0.840 m. Determine the acceleration of the bullet (assume a uniform acceleration). **a = 1.62*10^5 m/s^2**

13) A baseball is popped straight up into the air and has a hang-time of 6.25 s. Determine the height to which the ball rises before it reaches its peak. (Hint: the time to rise to the peak is one-half the total hang-time.) **d = 48.0 m**

14) The observation deck of tall skyscraper 370 m above the street. Determine the time required for a penny to free fall from the deck to the street below. **t = 8.69 s**

15) A bullet is moving at a speed of 367 m/s when it embeds into a lump of moist clay. The bullet

penetrates for a distance of 0.0621 m. Determine the acceleration of the bullet while moving into the clay. (Assume a uniform acceleration.) **a = -1.08*10^6 m/s^2**

16) A stone is dropped into a deep well and is heard to hit the water 3.41 s after being dropped. Determine the depth of the well. **h = -57.0 m**

17) It was once recorded that a Jaguar left skid marks that were 290 m in length. Assuming that the Jaguar skidded to a stop with a constant acceleration of -3.90 m/s^2, determine the speed of the Jaguar before it began to skid. **Vi = 47.6 m/s**

18) A plane has a takeoff speed of 88.3 m/s and requires 1365 m to reach that speed. Determine the acceleration of the plane and the time required to reach this speed. **a = 2.86 m/s^2 ; t = 30.8 s**

19) A dragster accelerates to a speed of 112 m/s over a distance of 398 m. Determine the acceleration (assume uniform) of the dragster. **a = 15.8 m/s^2**

20) With what speed in miles/hr (1 m/s = 2.23 mi/hr) must an object be thrown to reach a height of 91.5 m (equivalent to one football field)? Assume negligible air resistance. **Vi = 42.3 m/s = 94.4 mi/hr**