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.
2. A car starts from rest and accelerates uniformly over a time of 5.21 seconds for a distance of 110 Upton Chuck is riding the Giant Drop at Great America. If Upton free falls for 2.6 seconds, what will be his final velocity and how far will he fall?
3. 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.
4. 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.
5. 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 1.8 seconds, then what is the acceleration and what is the distance that the sled travels?
6. 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.
7. 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. The takeoff speed for this plane will be 65 m/s. Assuming this minimum acceleration, what is the minimum allowed length for the runway?
8. 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).
9. A kangaroo is capable of jumping to a height of 2.62 m. Determine the takeoff speed of the kangaroo.
10. 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)?
11. 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).
12. 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.)
13. 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.
14. 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.)
15. 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.
16. 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.
17. 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.
18. A dragster accelerates to a speed of 112 m/s over a distance of 398 m. Determine the acceleration (assume uniform) of the dragster.
19. 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.

Solutions

1. . d = 1720 m
2. a = 8.10 m/ s^2
3. V = -25.5 m/s (- indicates direction)
4. a = 11.2 m/s^2 , d = 79.8 m
5. t = 1.29 s
6. a = 247 m/s^2
7. d = 400 m
8. a = 0.712 m/s^2
9. d = 704 m
10. d = 28.6 m
11. v_i = 7.17 m/s
12. v_i = 5.03 m/s
13. hang time = 1.03 s
14. a = 1.62*10^5 m /s^2
15. v_i = 30.6 m/s , d = 47.9 m
16. t = 8.69 s
17. a = -1.08*10^6 m /s^2
18. d = -57.0 m
19. v_i = 47.6 m /s
20. a = 2.86 m/s^2
21. t = 30. 8 sa = 15.8 m/s^2
22. v_i = 42.3 m/s , v_i = 94.4 mi/hr
23.