Kinematics Homework Problems #3

p. 28 #22, 23, 30, 33, 34, 37

Problems taken from the school's old textbook:
Giancoli, D. (1980). *Physics*, 2nd Ed. Englewood Cliffs, NJ: Prentice Hall.

Answers are provided at the bottom of the page.

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22. A car traveling 80 km/h decelerates at a constant 1.5 m/s^2. Calculate
    a) the distance it goes before it stops.
    b) the time it takes to stop.
    c) the distance it travels DURING the first and third seconds (not between those two times but during the 1st second of travel, and then during the 3rd second of travel).

23. What is the stopping distance for an automobile having an initial speed of 80 km/h if the human reaction time is 1.0 s,
    a) For an acceleration of a = -4.0 m/s^2?
    b) For an acceleration of a = -8.0 m/s^2?

30. A runner hopes to complete the 5000-m run in less than 13.0 min. After exactly 11.0 min, there are still 800 m to go. The runner must accelerate at 0.20 m/s^2 for how many seconds in order to achieve the desired time?

33. A baseball is thrown vertically into the air with a speed of 24.7 m/s.
    a) How high does it go?
    b) How long does it take to return to the ground?

34.(a) How long does it take a brick to reach the ground if dropped from a height of 80.0 m? (b) What will be its velocity just before it reaches the ground?

37. A stone is dropped from the roof of a high building. A second stone is dropped 1.00 s later. How far apart are the stones when the second one has reached a speed of 23.0 m/s?

Answers:

22a. 165 m
22b. 14.8 s
22c. Distance travelled during 1st second: 21.5 m; distance travelled during the 3rd second: 18.5 m.
23a. 83.8 m
23b. 53.0 m
30. 1.55 s
33a. 31.1 m
33b. 5.04 s
34a. 4.04 s
34b. 39.6 m/s
37. 28 m