ARMS
ACADEMY

GENERAL PHYSICS 1

Exercise Ch 2

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Question one

A car travels in the +x-direction on a straight and level road. For the first 4.00 s of its motion, the average velocity of the car is $v_{av\text{-}x}$ = 6.25 m/s. How far does the car travel in 4.00 s?

Question two

A car is stopped at a traffic light. It then travels along a straight road such that its distance from the light is given by

$x(t) = bt^2 - ct^3$, where $b = 2.40\ m/s^2$ and $c = 0.120\ m/s^3$.

(a) Calculate the average velocity of the car for the time interval t = 0 to t = 10.0 s. (b) Calculate the instantaneous velocity of the car at t = 0, t = 5.0 s, and t = 10.0 s. (c) How long after starting from rest is the car again at rest?

Question three

A turtle crawls along a straight line, which we'll call the x-axis with the positive direction to the right. The equation for the turtle's position as a function of time is

$$x(t) = 50.0 \text{ cm} + (2.00 \text{ cm/s})t - (0.0625 \text{ cm/s}^2)t^2.$$

(a) Find the turtle's initial velocity, initial position, and initial acceleration. (b) At what time t is the velocity of the turtle zero? (c) How long after starting does it take the turtle to return to its starting point? (d) At what times t is the turtle a distance of 10.0 cm from its starting point? What is the velocity (magnitude and direction) of the turtle at each of those times? (e) Sketch graphs of x versus t, v_x versus t, and a_x versus t, for the time interval t = 0 to t = 40 s.

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Question four

A Fast Pitch. The fastest measured pitched baseball left the pitcher's hand at a speed of 45.0 m/s. If the pitcher was in contact with the ball over a distance of 1.50 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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