Physics 200 Name:

Extended Kinematics Problems

1. A car accelerates from rest at a constant rate of -4m/s2. After accelerating at this rate for a distance of 500m, the car turns off its engine and begins to coast. The car coasts for 22 seconds before finally coming to rest, and during this 22 seconds it slows down at a constant rate.

a. What was the car’s maximum speed during this event?

b. What was the car’s velocity when it reached its maximum speed?

c. At what time did the car reach that velocity?

d. What was the car’s acceleration during its coasting period?

e. How far did the car travel after its motor turned off?

f. What was the car’s total displacement?

2. A plastic action figure is launched vertically upward from a point 10m above the ground [At t = 0s, the height of the action figure is 10m above the ground]. From t=0s to t=6s, the action figure travels solely under the influence of gravity. Air resistance can be ignored for this time period. At t=6s, the action figure is descending downward from the sky, and its height is 80m. Between t=6s and t=7s, a parachute pops out of the figure and deploys, resulting in a constant deceleration to 3m/s for that 6s to 7s time period. From t=7seconds onward, the action figure floats the rest of the way to the Earth at a constant speed of 3m/s.

a. What was the action figure’s velocity at t=6s?

b. What was the action figure’s average acceleration between t=6s and t=7s?

c. What was the action figure’s displacement between t=6s and t=7s?

d. What was the action figure’s elevation at t=7s?

e. How long did the entire trip last?