Condition:

I have been trying to figure this out: An object moves with constant acceleration 3.65 m/s2 and over a time interval reaches a final velocity of 11.4 m/s.

(a) If its initial velocity is 5.7 m/s, what is its displacement during the time interval?

(b) What is the distance it travels during this interval?

(c) If its initial velocity is -5.7 m/s, what is its displacement during the time interval?
(d) What is the total distance it travels during the interval in part (c)?

Solution

Assume that positive x-axis directed to the right
(a)(b)

$v = v_{0o} + at$

$$t = \frac{(v - v_{0o})}{a} = \frac{(11.4 - 5.7)}{3.65} = 1.56s$$

displacement = distance $= v_{0o}t + \frac{at^2}{2} = 5.7 * 1.56 + \frac{3.65*1.56^2}{2} = 8.892 + 4.44 = 13.332\ m$ (from origin point - to theright)

(c)

$v = -v_{o0} + at$

$$t_1 = \frac{(0 + v_{o0})}{a} = \frac{5.7}{3.65} = 1.56\ s.$$

$$s_1 = {}_{o}\frac{{v_0}^2}{2a} = \frac{5.7^2}{2 * 3.65} = 4.5\ m\ (to\ the\ left)$$

$$v = a * t_2$$

$$t_2 = \frac{v}{a} = \frac{11.4}{3.65} = 3.12\ s.$$

$$s_2 = \frac{at_2^2}{2} = 3.65 * \frac{3.12^2}{2} = 17.77\ m\ (to\ the\ right)$$

$$Displacement = 17.77 - 4.5 = 13.27\ m$$

(d)

$$Distance = 4.5 + 17.77 = 22.27\ m$$

Answers: a,b: displacement = distance=$13.332\ m$; c: $Displacement = 13.27m$; d: $Distance = 22.27m$.