107. (Third problem of **Cluster 1**)
The problem consists of two parts (A to B at constant velocity, then B to C with constant acceleration). The constant velocity in part 1 is 20 m/s (taking the positive direction in the direction of motion) and $t_1 = 5.0$ s. In part 2, we have $v_0 = 20$ m/s, $v = 0$, and $t_2 = 10$ s.

(a) We find the distance in part 1 from $x - x_0 = vt_1$, so we obtain $x = 100$ m (taking A to be at the origin). And the position at the end of part 2 is then found using Eq. 2-17.

$$x = x_0 + \frac{1}{2}(v_0 + v)\,t_2 = 100 + \frac{1}{2}(20 + 0)(10) = 200 \text{ m} .$$

(b) The acceleration in part (a) can be found using Eq. 2-11.

$$v = v_0 + at_2 \quad \Longrightarrow \quad 0 = 20 + a(10) \quad .$$

Thus, we find $a = -2.0$ m/s^2. The negative sign indicates that the acceleration vector points opposite to the chosen positive direction (the direction of motion), which is what we expect of a deceleration.