

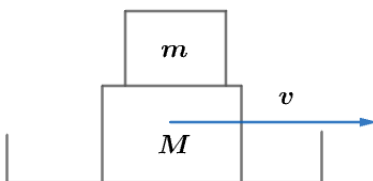
2008 F=ma Exam: Problem 7

Kevin S. Huang



Letting the rightward direction be positive, the system has initial momentum

$$p_i = Mv_1 - mv_2$$



The system has final momentum

$$p_f = (M + m)v$$

Conserving momentum,

$$(M + m)v = Mv_1 - mv_2$$
$$v = \frac{Mv_1 - mv_2}{M + m} = \frac{(120 \text{ kg})(2.0 \text{ m/s}) - (40 \text{ kg})(5.0 \text{ m/s})}{120 \text{ kg} + 40 \text{ kg}} = 0.25 \text{ m/s}$$

so the answer is $\boxed{\text{A}}$.