Answer on Question #72868 Physics / Other

A $m = 3000$ kg train is travelling $u = 30$ m/s towards east. It collides with a $M = 3500$ kg train with a velocity of $v = 40$ m/s towards the west. The two trains combine at impact. Find the velocity V of the combined trains.

Solution:

Let the direction toward the west is positive. The law of conservation of momentum gives

$$-mu + Mv = (m + M)V$$

Thus

$$V = \frac{-mu + Mv}{m + M}$$

$$V = \frac{-3000 \times 30 + 3500 \times 40}{3000 + 3500} = 7.7 \text{ m/s}$$

Answer: 7.7 m/s toward the west.