

A car of mass 1400 kg travels at 20 m/s and collides with a stationary truck of mass 2800 kg, with its parking brake off. The two vehicles interlock as a result of the collision and slide along the icy road. What is the velocity of the car truck system? Please show your work

Assume, that there is no friction between car/truck and road. So, we can use the law of conservation of momentum:

$$M_1 v_1 = (M_1 + M_2) v_2 \rightarrow v_2 = \frac{M_1 v_1}{(M_1 + M_2)}$$

Where M_1 – mass of car, M_2 - mass of truck, v_1 – velocity of the car, v_2 - velocity of the car truck system.

$$v_2 = \frac{1400kg * 20m/s}{(1400kg + 2800kg)} = \frac{1}{3} 20m/s \cong 6.67m/s$$