

**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.

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