

Answer on Question #45537, Physics, Mechanics | Kinematics | Dynamics

Question:

A truck is moving with a velocity of 20m/s. The mass of truck is 100Kg. An apple of mass 0.2Kg is moving with a velocity of 5m/s. The apple falls on the trolley. What is the final velocity of apple-truck together?

Answer:

The law of conservation of momentum:

$$Mv_t + mv_a = (M + m)u$$

where m is mass of the apple, M is mass of the truck, u is speed of the apple and the truck together, v_t is initial velocity of the truck, v_a is velocity of the apple.

Therefore:

$$u = \frac{Mv_t + mv_a}{m + M} = \frac{100 * 20 + 0.2 * 5}{100 + 0.2} = 19.97 \frac{m}{s}$$

Answer: $19.97 \frac{m}{s}$