

Q1 - Answer = c

Q2 - Problem A - Last name A-K

A 1000 kg car going 40 mph (18 m/s) crashes into a 3000 kg tree. In the process the tree is uprooted, lands on the car and they move off together. What is the total kinetic energy of the car and the tree?

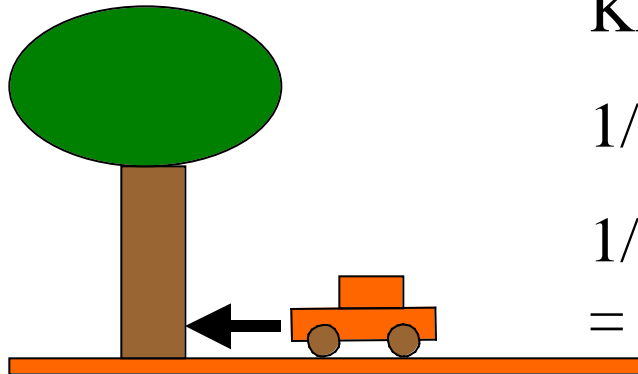
A. 40.5 x 10³ J

B. 54 x 10³ J

C. 16.2 x 10⁴ J

D. 49 x 10⁴ J

E. 18 x 10³ J



$$P_i = m_c v = P_f = V(m_c + m_t)$$

$$V = v m_c / (m_c + m_t)$$

$$KE = 1/2(m_c + m_t)V^2 =$$

$$1/2 m_c v^2 m_c / (m_c + m_t) =$$

$$1/2 \cdot 1000 \cdot 18^2 \cdot 1 / (1 + 3/1) \\ = 40.5 \times 10^3 \text{ J}$$

Q1 - Answer = c

Q2 - Problem B - Last Name L-Z

■ An 1100 kg car at rest is struck in the rear by a 2000 kg SUV going 20 m/s. As a result of the collision, the vehicles stick together and move off with the same speed. What is this final speed?

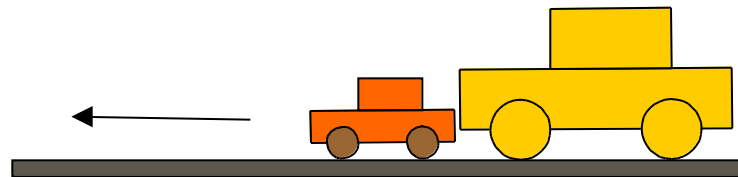
A. 20 m/s

B. **13 m/s**

C. 7.1 m/s

D. 11 m/s

E. 36 m/s



$$P_i = Mv = P_f = V(M+m) \rightarrow V = v \frac{M}{(M+m)}$$
$$= 20 \times 2000 / (2000 + 1100) = 13 \text{ m/s}$$