In case of emergency, the gas actuator is used to move a 75-kg block B by exploding a charge C near a pressurized cylinder of negligible mass. As a result of the explosion, the cylinder fractures and the released gas forces the front part of the cylinder, A, to move B (initially at rest) forward, giving it a speed \( v_B = 200 \text{ mm/s} \) in 0.4 s. If the coefficient of kinetic friction between B and the floor is \( \mu_k = 0.5 \), determine the impulse that the actuator imparts to B.

HINT: The actuator is not the only impulsive force acting on block B:

\[
 mv_i + (\sum F) \Delta t = mv_B
\]

\[
 F_A \Delta t = mv_B + (\mu_k N) \Delta t
\]

\[
 N \Delta t = (75 \text{ kg}) (9.8 \text{ m/s}^2) (0.4 \text{ s})
\]

\[
 F_A \Delta t = 162 \text{ kg-m/s}
\]