Chapter 9 review for the TEST

1) Know the following vocabulary words: Impulse, Airbags, Angular momentum, Angular impulse-angular momentum theorem, Torque, moment of inertia, 2-dimensional collisions, Newton's first law of motion, Newton's third law of motion, Isolated system, closed system, Conservation of momentum, Recoil, Conservation of Angular momentum, Linear momentum, and change in momentum.

2) Know the formulas for:
   a. Angular Impulse-angular momentum theorem
   b. Angular momentum
   c. Impulse
   d. Impulse-Momentum Theorem
   e. Law of Conservation of angular momentum
   f. Linear momentum
   g. Law of Conservation of momentum
   h. Angular Momentum of a moving object

3) Do pages 252 – 253 in the book problems:
   72, 74 ONLY b, c, d, e, 76, 77, & 79

4) Study book problems from pages 233, 235, 238, 240, & 243. Rework the problems on a separate piece of paper.

5) Study all worksheets for chapter 9. Rework the problems on a separate piece of paper.

6) Check answers for **BOTH** reviews on my website.

Pg. 252 - 253

(72) a) $F\Delta t = m\Delta V = m(V_f - V_i) = (20Kg)(0.0m/s - 10.0m/s) = -200\ Kg\,m/s$ or $-2.0\times10^{2}\ Kg\,m/s$

b) $F = \frac{m(V_f - V_i)}{\Delta t}$ $\frac{-200}{0.05} = -4.0\times10^{3}N$ or $-4000N$

73 b) $P_{FB} = m_{FB}V_{FB} = (95Kg)(8.0m/s) = 7.8\times10^{2}\ Kg\cdot m/s$

c) $\Delta P_{FB} = P_f - P_{FB} = 0 - P_{FB} = -7.8\times10^{2}\ Kg\,m/s$

d) $\Delta P_{DT} = P_f - P_{DT} = 0 - (-7.8\times10^{2}) = 7.8\times10^{2}\ Kg\,m/s$

e) $P_{DT} = -7.8\times10^{2}\ Kg\,m/s$

f) $m_{DT}V_{DT} = -7.8\times10^{2}\ Kg\,m/s \Rightarrow V_{DT} = \frac{-7.8\times10^{2}\ Kg\,m/s}{128Kg} = -6.1\ m/s$

74) b) $m_b v_{bi} = (1.00\times10^{-2}\text{kg})(0.100\text{m/s}) \equiv 1.0\times10^{-3}\text{ kg m/s}$
$m_c v_{ci} = (5.0\times10^{-3}\text{kg})(0.200\text{m/s}) \equiv 1.0\times10^{-3}\text{ kg m/s}$

c) $m_c v_{ci} = (5.0\times10^{-3}\text{kg})(0.080\text{m/s}) = 4.0\times10^{-4}\text{ kg m/s}$

d) $P_{ci} + P_{bi} = P_{cf} + P_{bf} \Rightarrow P_{bf} = P_{ci} + P_{bi} - P_{cf}$

$P_{bf} = (1.0\times10^{-3}) + (1.0\times10^{-3}) - (4.0\times10^{-4}) = 1.6\times10^{-3}\text{ kg m/s}$

e) $P_{bf} = m_b v_{bf} \Rightarrow v_{bf} = \frac{P_{bf}}{m_b} = \frac{1.6\times10^{-3}\text{kg m/s}}{1.00\times10^{-2}\text{ kg}} = 0.16\text{ m/s}$ or 16 cm/s

76) $P_{ci} + P_{bi} = P_{cf} + P_{bf} \Rightarrow m_c v_{ci} + m_b v_{bi} = m_c v_{cf} + m_b v_{bf}$ ②

$v_{bf} = \frac{m_c v_{ci} + m_b v_{bi} - m_c v_{cf}}{m_b}$ Assuming that the projectile, C is launched in the direction of B

$v_{bf} = \frac{(0.05\text{kg})(2) + (4.65)(2) - (0.05)(6.47)}{4.65} = -4.94\text{ m/s}$ or 4.94 backwards

77) $m_c v_{ci} + m_b v_{bi} = m_c v_{cf} + m_b v_{bf}$

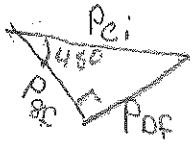
$v_{bf} = \frac{m_c v_{ci} + m_b v_{bi} - m_c v_{cf}}{m_b}$ The Block (B) is initially at Rest ∴

$\frac{m_c v_{ci} - m_c v_{cf}}{m_b} \Rightarrow \frac{m_c(v_{ci} - v_{cf})}{m_b}$

$v_{bf} = \frac{(0.0120\text{kg})(150\text{m/s} - (-1.0\times10^{2}\text{m/s}))}{9.5\text{kg}} = 0.55\text{ m/s}$

79) $P_{cf} = P_{ci}\sin 45^\circ \Rightarrow m_c v_{cf} = m_c v_{ci}\sin 45^\circ \Rightarrow v_{cf} = v_{ci}\sin 45^\circ$

$v_{cf} = (4)(\sin 45^\circ) = 2.8\text{ m/s}$



For the eight ball

$P_{8f} = P_{ci}\cos 45^\circ$

$m_8 v_{8f} = m_c v_{ci}\cos 45 \Rightarrow m_8 = m_c$

$v_{8f} = v_{ci}\cos 45$
$= (4)(\cos 45)$
$= 2.8\text{ m/s}$