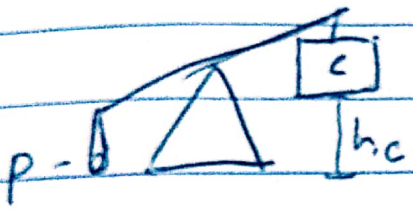
Date

20-P-WE-BK-012



a.) to lift the counterweight to a height "h_c" requires energy $m_c g h_c$

$$\text{time} = \text{energy}/\text{power} = mgh/P$$

b.) the projectile gains energy equal to

$$m_p g h_p + \tfrac{1}{2} m_p v^2 = E_p$$

$$\text{Power} = E_p/t$$

c.) since the energy is stored and released over different time periods, we need to compare energy, not power, for efficiency.

$$\text{Eff} = E_p/E_c = \frac{m_p g h_p + \frac{1}{2} m_p v^2}{m_c g h_c} \cdot 100\%$$