Sample Exam III

Multiple Choice 1-b, 2-d, 3-e, 4-c

Problems

1- Conservation of Momentum of bullet-block system

$P_i = .02\,kg \cdot 200\,m/s = 4\,kg\,m/s$ block has 0 initial momentum

$P_f = P_{bul} + P_{block} = -.02 \cdot 100 + 2V_{block} = -2\,kg\,m/s + 2V_{block}\,kg$

$P_i = P_f \qquad 4 = -2 + 2V \qquad 2V = 6$ $\boxed{V = 3\,m/s}$

2- $P_{ower} = \frac{\Delta E}{\Delta t}$ $\Delta t = 4\,sec$ we have to calculate ΔE

$\Delta E = E_F - E_i = \frac{1}{2}mV_f^2 - 0$

$\Delta E = \frac{1}{2}(500) \cdot (125)^2 = 3.9 \times 10^6\,J$

$\boxed{P = \frac{\Delta E}{\Delta t} = 977\,kW}$