

## SOLUTIONS TO T2 BY WAITZ

1) WORK INPUT:

$$\text{WORK}_i = \text{POWER} \cdot \text{TIME} = V \cdot I \cdot t = (12\text{V})(3\text{A})(50\text{s}) = -1800\text{J}$$

(minus sign since work on system)

1) WORK TO RAISE PISTON:

$$\text{WORK}_p = \text{FORCE} \cdot \text{DISTANCE} = mg \cdot d = (100\text{kg})(9.8\text{m/s}^2)(0.1\text{m}) = 98\text{J}$$

1) WORK DONE AGAINST ATMOSPHERE

$$\text{WORK}_A = \text{FORCE} \cdot \text{DISTANCE} = p \cdot A \cdot d = (10^5\text{N/m}^2)(0.05\text{m}^2)(0.1\text{m}) = 500\text{J}$$

$$1) \text{ NET WORK} = W_i + W_p + W_A = -1800 + 98 + 500 = -1202\text{J}$$

(NOTE, IF YOU WERE UNCLEAR ON THE WORDING OF THE PROBLEM AND ONLY SUMMED UP THE WORK BY THE GAS,  $W_p + W_A = 598\text{J}$ , THAT IS OKAY.)

$$2) \Delta U = Q - W = 0$$

$$Q = W \quad \therefore Q = -1202\text{J}$$

(heat transfer from the system)