Second Alternative Solution of Pr 1. Sec. 3:

$$W_{cy} = \cancel{W_1}^{=0} + W_2 + W_3 = W_{ad.} + W_{isob.}$$

since V = const

$\Delta E_{int} = Q + W$ for adiabatic $Q = 0 \Rightarrow \Delta E_{int} = W_{ad.}$

i.e.

$$\Delta E_{int} = nC_v \Delta T = n\left[\frac{5}{2}R\right](T_f - T_i)$$

$$= n\frac{5}{2}R(T_C - T_B)$$

$$n = \frac{P_A V_A}{RT_A} \Rightarrow \Delta E_{int} = \frac{P_A V_A}{\cancel{RT_A}} \cdot \frac{5}{2}\cancel{R}(T_C - T_B)$$

$T_B = 2T_A$; $T_C = (2^{5/7})T_A$

$$\Delta E_{int} = P_A V_A \cdot \frac{5}{2}\frac{1}{\cancel{T_A}}\left(2^{5/7}\cancel{T_A} - 2\cancel{T_A}\right) = -(0.36)\frac{5}{2}P_A V_A$$

$W_{ad} = -(0.90) P_A V_A$;

$W_{isob} = -P_A(V_f - V_i) = -P_A(V_A - V_C) = -P_A(V_A - 2^{5/7}V_A)$

$= 0.64 P_A V_A$

$$W_{cy} = W_{ad} + W_{isob} = -0.90 P_A V_A + 0.64 P_A V_A = -0.26 P_A V_A$$

$$\boxed{W_{cy} = -52.7 \text{ J}}$$ Q.E.D.