

# Reading 1/30

① The convention is  $W = W_{\text{done on system}} = - \int_i^f p dV$

② (a) ... it's on a higher isotherm  
 $pV_f > pV_i \Rightarrow nRT_f > nRT_i$



(b) positive (+) because  $U = U(T)$  is a monotonically increasing function

so  $\Delta T > 0 \Rightarrow \Delta U > 0$

(c)  $W_{by} > 0$   $W_{by} = + \int_i^f p dV = p \Delta V > 0$   
 isobaric

(d)  $W = -W_{by} < 0$  is negative

(e)  $\Delta U = W + Q$  Looking at both sides, it must be  
 $(+) = (-) + \dots$  that  $Q > 0$  (and  $Q > |W|$  and  $Q > |\Delta U|$ )

(f) The only graph consistent with that is [C]

③  $\Delta E_{th} > 0 \Rightarrow$  higher isotherm

$W > 0 \Rightarrow W_{by} < 0 \Rightarrow$  area should be negative/  
 gas should be compressed  
 $\Rightarrow V_f < V_i$

