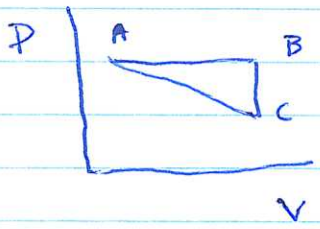
60

HW 16 p355 Problem 70
p 457 Problems 21, 26
online Expansion + Compress Gas

p355 - Problems

(6)

70) P vs V graph



a) From A to B

- undergoes isobaric expansion

b) From B to C

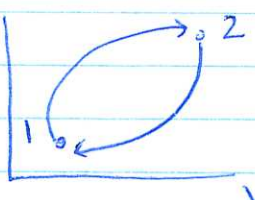
(1)

- undergoes isochoric cooling

c) From C to A

- is compressed back to start

p 457 – Problems

21) 

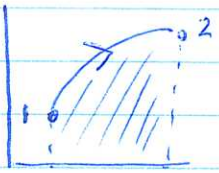
online essay

a) What happened to thermal energy?

- As it goes from 1→2 P↑V↑ so T↑.
- As it goes from 2→1 P↓V↓ so T↓
- Overall no ΔU, ΔT b/c return to initial state

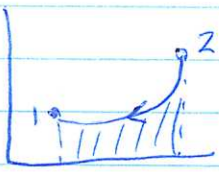
b) Work done 1→2 (choose graph)

(2)



W = area under curve

c) work done 2→1 (choose graph)



W = area under curve

d) Work ON gas 1→2→1 • negative

e) total heating 1→2→1 • positive (Q+ to balance −W for no ΔU)

(7) 6

26) $n = 1\,mol$
Molar mass $= M$
$\Delta T = 1K$

a) energy through isochoric heating?

$\Delta V = 0J$ so $W = 0J$

$\Delta U = Q + W$ $\quad \Delta U = \frac{3}{2} n R \Delta T$

$= \frac{3}{2}(1\,mol)(8.31\ \frac{J}{mol K})(1K)$

$= 12.465J = 12.5J$

(2)

b) energy through isobaric heating?

$\Delta U = Q + W$ $\quad Q = \Delta U - W$

$= \Delta U - (-P\Delta V)$ $\quad PV = nRT$

$= \Delta U - (-nR\Delta T)$

$= 12.5J - (-(1mol)(8.31\ \frac{J}{mol K})(1K))$

$= 20.8J$

c) energy through adiabatic heating?

$Q = 0J$ adiabatic → no Q transfer

7/6

- Online - Expansion & Compress Gas

a) Ideal gas expands through adiabatic
True statements?

✗ work done by gas is −, heat added
✓. work done by gas is +, no heat exchang
✗ internal energy increased
✓. internal energy decreased

(1) b) After adiabatic, does compression back to original

✓. total change in internal energy after process must be zero
✗. total change in internal energy after process must be −
✗. total change in temp after process must be +
✓. total work done by system must equal heat exchanged during process