

Quiz 3
4/27/07
Physics 219

(a) (5 points) The heat absorbed by N particles of an ideal gas in a quasi-static process in which the temperature T changes by dT and its volume V by dV is given by

$$dQ = C_V dT + \bar{p} dV$$

where C_V is its heat capacity at constant volume and \bar{p} is the mean pressure. Find an expression for the change of entropy of this gas in a quasi-static process which takes it from initial values of temperature T_i and volume V_i to final values T_f and volume V_f . Does your answer depend on the particular quasi-static process (i.e. the path) involved in going from the initial to the final state?

(b) (5 points) Now assume that this gas is thermally insulated and is allowed to expand quasi-statically from an initial volume V_i at temperature T_i to a final volume V_f . Using the result from part (a), find the final temperature T_f .