South Dakota School of Mines and Technology
Department of Materials and Metallurgical Engineering

MET 320   HQ 1   MI 220
9:00 AM Sept 26, 2005

CLOSED BOOK and NOTES
- NO CALCULATORS
- Algebraic Answers Preferred
- Leave R in the equation but write out its value to achieve proper units.

UNITS (Algebraic answers should be left in a form to obtain these units
- q, w, U, and H [=] Joules
- S [=] J/K
- V[=]Liters
- T [=] K
- P [=] atm

SHOW ALL WORK ON THIS SHEET.
- Turn in only the problem sheets with the problems on them.
- Keep or discard all other paper

1. One mole of ideal monatomic gas at 500 K performs 1000 J of work while receiving 300 Joules of heat. What is its final temperature?

2. Ideal diatomic gas in a diesel engine at 1 atm and 300 K is adiabatically compressed to 1/20th of it original volume. What are the final T, P and q, w, ΔU, ΔH, and ΔS for the process?

For problems 3, 4, and 5
One hundred (100) moles of ideal gas at 1000 K and 10 atm are expanded to 10 times its original volume. Find q, w, ΔU, ΔH, final T, and final V if

3. The process is conducted reversibly and isothermally.

4. The process is conducted isothermally but the work of the process is only the work to push back the atmosphere (assumed to be constant at 1 atm).

Cont'd For problems 3, 4, and 5
One hundred (100) moles of ideal gas at 1000 K and 10 atm are expanded to 10 times its original volume. Find q, w, ΔU, ΔH, final T, and final V if

5. The process is conducted isobarically.