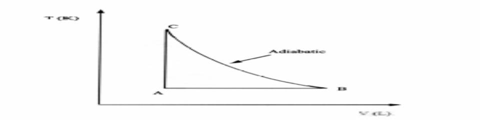
Hw-CHAPTER-20 (Dr. Gondal Phys. 25-27)

TM 001

1)Two moles of helium (monatomic) gas are heated from 100 degree Celsius to 250 degree Celsius. How much heat is transferred to the gas if the process is isobaric? A: 6.23*10**3 J.

2) An ideal monatomic gas goes through the process in T-V diagram of figure (1) .At Point A, the temperature is 400 K, and the volume is 2 liters. If the volume at point B is 10 liters, what is the temperature at point C be? A: 1.17*10**3 K.



3) Five moles of an ideal gas expands isothermally at 100 degree Celsius to five times its initial volume. Find the heat flow into the system. A: 2.5*10**4 J

4) Two kilograms of water, at 1 degree Celsius, occupy a volume of 2.0*10**-3 m**3. When this amount of water is boiled, at atmospheric pressure, it becomes 3.3 m**3 of steam. Find the change in the internal energy. A: 4.2*10**6 J.

TM002

1) 5 moles of hydrogen gas occupy a balloon that is inflated to a volume of 0.3 m**3 and at 1.0 atmospheric pressure. What is the root-mean square velocity of the molecules inside the balloon?[The mass of hydrogen atom is 1.66*10**(-27) kg]. **A:** 4.3*10**3 m/s.

2)Helium gas is heated at constant pressure from 32 degrees 20 Fahrenheit to 212 degrees Fahrenheit. If the gas does 20.0 Joules of work during the process, what is the number of moles? A: 0.024 moles.

3) Two moles of helium (monatomic) gas are heated from 20 degrees Celsius to 250 degrees Celsius. How much heat is transferred to the gas if the process is isobaric? **A:** 6.23 kJ.

4)An ideal diatomic gas, initially at a pressure Pi = 1.0 atm and volume Vi, is allowed to expand isothermally until its volume doubles. The gas is then compressed adiabatically until it reaches its original volume. The final pressure of the gas will be: **A:** 1.3 atm.

5) One mole of an ideal gas undergoes the thermodynamic process shown in figure (2). If the process BC is an isothermal, how much work is done by the gas in this isothermal process? **A:** 0.56*10**3 J.

TM012

1) Two moles of a monatomic ideal gas at a temperature of 300 K and pressure of 0.20 atm is compressed isothermally (constant temperature) to a pressure of 0.80 atm. Find the work done by the gas. A: -6900 J

2) An ideal gas undergoes an isothermal process starting with a pressure of 2*10**5 Pa and a volume of 6 cm3. Which of the following might be the pressure and volume of the final state? **A:** 6*10**5 Pa and 2 cm**3.

3) Two moles of a monatomic ideal gas is compressed at a constant pressure of 1.5 atm from a volume of 70 liters to 35 liters. Calculate the change in internal energy of the gas. **A:** - 1.3*10**4 J

4) In an adiabatic process, the temperature of one mole of an ideal monatomic gas is decreased from 500 K to 400 K. What is the work done during the process in calories? **A:** 300

TM 032

1) One mole of oxygen molecule (M = 32 g/mol) occupies a cubic 20 Q0 vessel of side length 10 cm at a temperature of 27 degree-C. Calculate the pressure of the gas on the walls. **A:**1 2.49*10**6 Pa.

2) The equation of state of a certain gas is given as P*V**2 = K, 20 where P is the pressure, V is the volume and K is a constant. Find the work done by the gas if its volume increases from Vi = 2.0 m**3 to a final volume Vf = 4.0 m**3. **A**: K/4.

3) A diatomic ideal gas undergoes a constant pressure process in 20 which its internal energy increases by 540 J. Find the heat added to the gas and the work done by the gas. **A:** = 756 J, W = 216 J.

4) The air in an automobile engine at 20 degree-C is compressed 21 0 adiabatically from an initial pressure of 1 atm and a volume Q0 of 200 cm**3 to a final volume of 20 cm**3. Find the final Q0 temperature if the air behaves like an ideal gas. [Take gamma = 1.4] **A:**463 degree-C

TM041

1) The temperature of two moles of helium gas is raised from zero degrees Celsius to 100 degrees Celsius at constant pressure. Calculate the work done by the gas? A: 1.66 kJ.

2) A cylinder of volume 2.5 L contains 0.25 moles of helium [M = 4.0 grams/mole] at 2.0 atmospheric pressure. What is the internal energy of the gas? A: 0.76 kJ.

TM 011

TM1) Two identical containers, one has 2.0 moles of type 1 molecules, of mass m1, at 20 degrees Celsius. The other has 2.0 moles of type 2 molecules, of mass m2 = 2*m1, at 20 degrees Celsius. The ratio between the average translational kinetic energy of type 2 to that of type 1 is: A. 8.

Chapter 20 HW Problems

P (2), P (5), P (7), P (9), P (13), P (14), P (19), P (26), P (46), P (48), P (54), P (55), P (61)