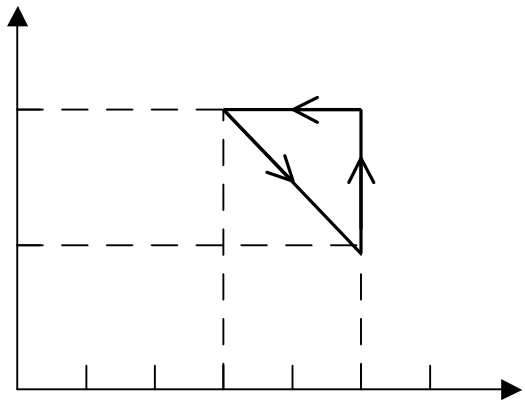
Chapter 20



1- One mole of an ideal gas is taken through the cyclic process ABCA as shown in Fig. (2). What is the net heat transfer during the cycle? [-1.0*10*3 J]

2- A diatomic ideal gas, at a pressure of 1.0 atm, expands isobarically from a volume of 2.0 Liters to a volume of 5.0 Liters. Calculate the change in internal energy of the gas during the process. [7.6*10**2 J]

3- 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: [1]

4- 300 grams of water at 25 degree-C are added to 100 grams of ice 20 at zero degree-C. The final temperature of the mixture is: [zero degree-C]

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

6- The equation of state of a certain gas is given as P*V**2 = K, 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. [K/4]

7- A diatomic ideal gas undergoes a constant pressure process in which its internal energy increases by 540 J. Find the heat added to the gas and the work done by the gas.[Q = 756 J, W = 216 J]

8- 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]. [4.3*10**3 m/s]

9- Helium gas is heated at constant pressure from 32 degrees Fahrenheit to 212 degrees Fahrenheit. If the gas does 20.0 Joules of work during the process, what is the number of moles? [0.024 moles]

10- Two moles of helium (monatomic) gas are heated from 100 degrees Celsius to 250 degrees Celsius. How much heat is transferred to the gas if the process is isobaric? [6.23 kJ]

11- 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: [1.3 atm]