Thermodynamics problems

An air bubble moves upwards in water. At 15 m depth under the water surface its volume is 5 mm^3. How large will be the volume of the bubble just under the water surface if the temperature of water is constant and the air pressure is 10^5 Pa? (12.5 mm^3)

How large is the volume of 1 mol ideal gas at 100 °C temperature and $2*10^5$ Pa pressure? (15.5 dm^3)

A gas-holder of 44 l volume contains He gas at 150 atm pressure and 300 K temperature. How large volume of liquid He can be produced from it if the density of liquid helium is 125 kg/m^3 ? (8.5 l)

The volume of an oxygen-tank is 0.1 m^3, the pressure of oxygen inside is $5*10^6$ Pa, the temperature is 47 °C. The oxygen gas starts to escape from the tank and the pressure inside decreases to $4*10^6$ Pa, the temperature decreases to 27 °C. How large is the mass of the gas that escaped from the tank? (0.88 kg)

How large is the mass of sweat (water) evaporated by a man with 80 kg body weight assuming that his body temperature decreased due to the evaporation by 1 °C? (Assume, that the human body consists mostly of water and the heat of evaporation of water at body temperature (37 °C) is around 2400 J/g) (14 dkg)

There is 48 g ice in an aluminum container of 10 g mass which has a heat-isolating wall. The initial temperature is 0 °C. We pour 75 g water of 80 °C temperature into the container. What will be the equilibrium temperature? (17.5 °C)

A gas is contained in a vertical, frictionless piston-cylinder device. The piston has a mass of 10 kg with a cross-sectional area of 20 cm^2 and is pulled with a force of 100 N. If the atmospheric pressure is 100 kPa, determine the pressure inside. Also determine the boundary work transfer, if the volume expands by 0.1 m^3. (100 kPa, 10 kJ)

What percentage of the chemical bonds is broken at body temperature? Calculate for different bond energies: 200 kJ/mol and 0.5 kJ/mol. ($2 \cdot 10^{-32}$ % and 82 % respectively)

Assuming quiet atmosphere of 5 ºC temperature at what altitude would the oxygen concentration decrease to half? And to the factor of 1/e? (5 km, 7.1 km)

We transfer energy to a thermodynamic system of 350 K temperature. How much energy was transferred, if the ratio of microstate number belonging to macrostates before and after the change is $10^{(10^{10})}$? The temperature of the system is constant. (483 mJ)