



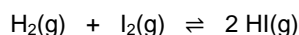
# K<sub>p</sub> PROBLEMS

In each question give your answer to the appropriate number of significant figures.

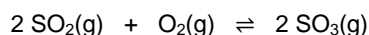
- 1) 1.000 moles of PCl<sub>5</sub> vapour are heated to 500 K in a sealed vessel. The equilibrium mixture, at a pressure of 625 kPa, contains 0.600 moles of chlorine. Calculate K<sub>p</sub>.



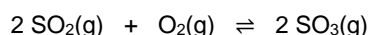
- 2) A mixture of 1.90 moles of H<sub>2</sub> and 1.90 moles of I<sub>2</sub> were allowed to reach equilibrium at 710 K. The equilibrium mixture was found to contain 3.00 moles of HI. Calculate K<sub>p</sub>.



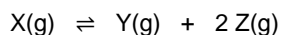
- 3) For the equilibrium below calculate K<sub>p</sub> if pO<sub>2</sub> = 102 kPa, pSO<sub>2</sub> = 251 kPa, pSO<sub>3</sub> = 508 kPa.



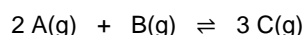
- 4) 2.00 moles of sulphur dioxide and 1.00 mole of oxygen were mixed and allowed to reach equilibrium in the presence of a suitable catalyst under a total pressure of 500000 Pa. At equilibrium, 0.67 moles of oxygen were present. Find K<sub>p</sub>.



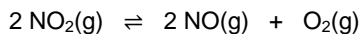
- 5) 2.00 moles of X was heated to a temperature of 2000°C until equilibrium was established under a total pressure of 8.00 x 10<sup>7</sup> Pa. At equilibrium, X was found to have undergone 20% dissociation. Calculate K<sub>p</sub>.



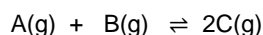
- 6) 2.00 moles of A was mixed with 2.00 moles of B and the mixture allowed to reach equilibrium at 500°C. The equilibrium mixture was found to contain 0.90 mole of A. Calculate K<sub>p</sub>.



- 7) In the following reaction at 700 K, the amount of each gas present at equilibrium is 0.960 moles of NO<sub>2</sub>, 0.040 moles of NO, and 0.020 moles of O<sub>2</sub>. If K<sub>p</sub> = 6.80 x 10<sup>-6</sup> atm, what must the total pressure have been to achieve this particular equilibrium mixture?



- 8) Calculate the number of moles of each species at equilibrium if 0.50 moles of A and 0.50 moles of B are mixed at 500 K, given that K<sub>p</sub> = 2.55 at this temperature and pressure = P (you will **NOT** need to use a quadratic equation to solve this).



- 9) Calculate the number of moles of each species at equilibrium if 5.00 moles of CO<sub>2</sub> and 1.00 mole of H<sub>2</sub> are mixed at 1000 K, given that K<sub>p</sub> = 0.72 at this temperature and pressure = P (you will need to use a quadratic equation to solve this).

