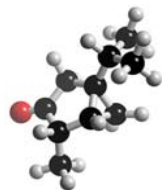


K_c CALCULATIONS

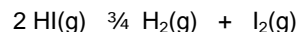
Name



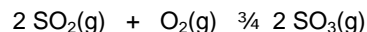
- 1) 2.0 moles of PCl₅ vapour are heated to 500 K in a vessel of volume 20 dm³. The equilibrium mixture contains 1.2 moles of chlorine. Calculate K_c for the equilibrium at 500K.



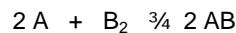
- 2) The following equilibrium is established at 444°C when 1.0 mol of HI is contained. It is found that the HI has undergone 22% dissociation. Calculate K_c.



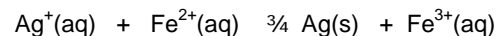
- 3) Calculate K_c for the following equilibrium at a particular temperature, given the results of an analysis of the equilibrium mixture which show that the concentration of SO₂ = 0.23, O₂ = 1.37, and SO₃ = 0.92 mol dm⁻³.



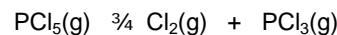
- 4) Calculate K_c for the equilibrium below if [A] = 0.02 mol dm⁻³, [B₂] = 0.1 mol dm⁻³ and [AB] = 0.4 mol dm⁻³.



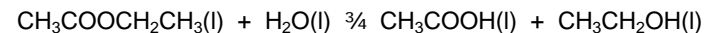
- 5) An aqueous solution is made by dissolving 1.0 moles of AgNO₃ and 1.0 moles of FeSO₄ in water and making up to 1.00 dm³. When equilibrium is established, there was found to be 0.44 moles of Ag⁺. Calculate K_c.



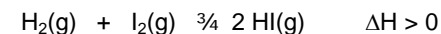
- 6) Some PCl₅ was heated in a sealed container at 250°C, resulting in the following equilibrium. Analysis of the equilibrium mixture showed that it contained 0.0042 moles of PCl₅, 0.040 moles of PCl₃ and 0.040 moles of Cl₂. The total volume was 2.0 dm³. Calculate the concentration of each species at equilibrium and then K_c.



- 7) 200.0 g of ethyl ethanoate and 7.0 g of water were refluxed together. At equilibrium, the mixture contained 0.25 mol of ethanoic acid. Calculate K_c for the hydrolysis of ethyl ethanoate.

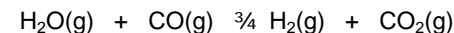


- 8) In the following equilibrium, K_c = 54.1 at a particular temperature. The equilibrium mixture was found to contain H₂ at a concentration of 0.48 x 10⁻³ mol dm⁻³, and HI at a concentration of 3.53 x 10⁻³ mol dm⁻³. The

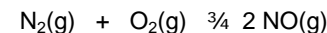


- What is the equilibrium concentration of I₂?
- What effect would doubling the concentration of hydrogen have on the equilibrium position and K_c?
- What effect would increasing the temperature have on the equilibrium position and K_c?

- 9) When 1.0 moles of steam and 1.0 moles of carbon monoxide were allowed to reach equilibrium, 33.3 % of the equilibrium volume is hydrogen. Calculate K_c at this temperature (you will need to think **very** carefully about equilibrium quantities).



- 10) K_c for the equilibrium below is 0.0036 at 2680 K. If 1 mole of N₂ and 1 mole of O₂ are allowed to reach equilibrium at 2680 K, what mass of NO will be present in the mixture (you will need to solve a quadratic equation to answer this)?



- 11) K_c for the equilibrium below is 10 at 450 K. If 1 mole of the ester is mixed with 5 moles of water and the mixture allowed to reach equilibrium, how many moles of each species will be present at equilibrium (you will need to solve a quadratic equation to answer this)?

