

Chemistry 225 Semester 04-2016

Homework for Submission #4b

Answer the following questions carefully *on this sheet* and submit them for marking as instructed. Only answers showing full working may attract full marks. Careless and sloppy work will be penalised. Express your numerical answers to the correct number of significant figures. Make sure you include correct units where appropriate. *Answers showing evidence of copying will attract zero marks.*

- 1) The solubility product of magnesium hydroxide is 1.8×10^{-11} @25°C.
- a) Write the equilibrium equation relating to this solubility product. (2)

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- b) Write the equilibrium expression relating to it in the form K_{sp} (2)

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- c) Calculate the molar solubility of magnesium hydroxide in water at 25°C, assuming no hydroxide ions are contributed by water. (4)

- d) What effect would you expect the addition of sodium hydroxide solution to a mixture of magnesium hydroxide and water would have on the solubility of the magnesium hydroxide? Explain with reference to Le Chatelier's principle. (3)

e) 35cm^3 of 0.010M magnesium sulfate solution is added to 65cm^3 of 0.010M sodium hydroxide solution. Determine whether precipitation occurs or not. (4)

2) Chlorine gas may be prepared by the action of potassium permanganate on concentrated hydrochloric acid in aqueous solution. The permanganate ions are **reduced** to manganese(II), and the chloride ions **oxidised** to chlorine gas. Derive a balanced ionic equation to show this process, showing the essential steps of the derivation. (6)