Extra questions for Study Unit 9

QUESTION 1

Die oplosbaarheidsproduk-konstante van kadmiumfluoried is 6.44 x 10^{-3} by 25^0C. Bereken die hoeveelheid (in gram en in milligram) CdF_2 wat sal oplos in 'n half liter water by 25^0C.

The solubility product constant of cadmium fluoride is 6.44 x 10^{-3} at 25^0C. Calculate the amount (in gram and in milligram) of CdF_2 that will dissolve in half a litre of water at 25^0C.

(**Gegee: /** *Given:* M_{H2O} = 18.02 g.mol^{-1} en/*and* M_{CdF2} = 150.38 g.mol^{-1})

Question 2

Definieer 'n bufferoplossing. Van wat word 'n bufferoplossing berei? Beskryf hoe buffers bygevoegde H^+- en OH^--ione absorbeer sodat 'n baie klein pH verandering plaasvind. 'n Sekere buffer is berei deur $NaHCO_3$ en $NaCO_3$ in water op te los. Skryf reaksievergelykings neer wat wys hoe die buffer bygevoegde H^+- en OH^--ione sal neutraliseer.

Define a buffer solution. What makes up a buffered solution? Explain how buffers absorb added H^+ or OH^- with little pH change. A certain buffer is made by dissolving $NaHCO_3$ and Na_2CO_3 in come water. Write equations to show how this buffer neutralizes added H^+ and OH^-.

Question 3

Die oplosbaarheidsproduk-konstante van kalsiumkarbonaat is 3.3 x 10^{-9} by 25^0C. Bereken die hoeveelheid (in gram en in milligram) $CaCO_3$ wat sal oplos in 'n half liter water by 25^0C. / The solubility product constant of calcium carbonate is 3.3 x 10^{-9} at 25^0C. Calculate the amount (in gram and in milligram) of $CaCO_3$ that will dissolve in half a litre of water at 25^0C. (**Gegee: /** *Given:* M_{H2O} = 18.02 g.mol^{-1} en/*and* M_{CaCO3} = 100.1 g.mol^{-1})

Question 4

Jy wil 'n 1.0 L bufferoplossing met 'n pH van 4.30 berei. 'n Lys van moontlike sure (en hul gekonjugeerde basisse) word gegee: / *You wish to prepare 1.0 L of a buffer solution with a pH of 4.30. A list of possible acids (and their conjugate bases) is given:*

Suur. / *Acid.*	Gekonjugeerde basis. *Conjugate base.*	K_a	pK_a
HSO_4^-	SO_4^{2-}	1.2×10^{-2}	1.92
CH_3COOH	CH_3COO^-	1.8×10^{-5}	4.74
HCO_3^-	CO_3^{2-}	4.8×10^{-11}	10.32

Watter suur/basis kombinasie moet gebruik word as buffer **en** wat moet die verhouding van die suur en gekonjugeerde basis wees? / *Which combination should be selected as a buffer solution **and** what should be the ratio of the acid to conjugate base?*

Question 5

Bereken die wateroplosbaarheid van Ag_3PO_4 ($K_{sp} = 1.8 \times 10^{-18}$ and $M_{Ag3PO4} = 418.7$ g.mol^{-1}) in mol per liter **en** in gram per liter. / *Calculate the water solubility of Ag$_3$PO$_4$ (K$_{sp}$ = 1.8 x 10^{-18} and M$_{Ag3PO4}$ = 418.7 g.mol^{-1}) in moles per litre **and** in grams per litre.*

Question 6

Sal 'n presipitaat vorm wanneer 50 cm^3 van 'n 5 x 10^{-4} mol/dm^3 Ca(NO$_3$)$_2$ oplossing by 'n 50 cm^3 van 'n 2 x 10^{-4} mol/dm^3 NaF oplossing gevoeg word? (K_{sp} (CaF$_2$) = 1.7 x 10^{-10}). / *Will a precipitate form when 50 cm^3 of a 5 x 10^{-4} mol/dm^3 Ca(NO$_3$)$_2$ solution is added to 50 cm^3 of a 2 x 10^{-4} mol/dm^3 NaF solution? (K$_{sp}$ (CaF$_2$) = 1.7 x 10^{-10}).*

$$CaF_2 \text{ (s)} \leftrightarrows Ca^{2+} \text{ (aq)} + 2F^- \text{ (aq)}$$