This print-out should have 10 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001   10.0 points

What is K_{sp} for Ag_3PO_4, if its molar solubility is 2.7×10^{-6} mol/L?

1. 5.3×10^{-23}

2. 4.8×10^{-22}

3. 2.0×10^{-17}

4. 5.3×10^{-16}

5. 7.3×10^{-12}

6. 1.7×10^{-14}

7. 1.4×10^{-21}

002   10.0 points

What is the molar solubility of CuBr in 0.5 M NaBr? The K_{sp} is 4.2×10^{-8}.

1. 2.05×10^{-4}

2. 4.20×10^{-8}

3. 4.20×10^{-7}

4. 8.40×10^{-8}

5. 3.48×10^{-3}

003   10.0 points

A solution is 0.01 M $BaCl_2$ and 0.02 M $SrCl_2$. Which cation can be selectively precipitated first with a concentrated Na_2SO_4 solution? K_{sp} is 1.5×10^{-9} for $BaSO_4$, and 7.6×10^{-7} for $SrSO_4$.

1. Ba^{+2}

2. Both will precipitate at the same time.

3. Sr^{+2}

004   10.0 points

Rank following salts from least to most soluble:

BiI	$K_{sp} = 7.7 \times 10^{-19}$
$Cd_3(AsO_4)_2$	$K_{sp} = 2.2 \times 10^{-33}$
$AlPO_4$	$K_{sp} = 9.8 \times 10^{-21}$
$CaSO_4$	$K_{sp} = 4.9 \times 10^{-5}$

1. $BiI < Cd_3(AsO_4)_2 < CaSO_4 < AlPO_4$

2. $AlPO_4 < BiI < Cd_3(AsO_4)_2 < CaSO_4$

3. $CaSO_4 < AlPO_4 < BiI < Cd_3(AsO_4)_2$
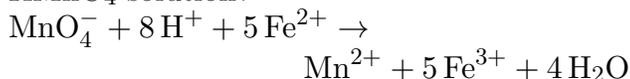
4. $Cd_3(AsO_4)_2 < CaSO_4 < AlPO_4 < BiI$

005   10.0 points

What is the molar solubility of $PbCl_2$ in an aqueous solution of 0.5 M NaCl? The K_{sp} of $PbCl_2$ is 1.14×10^{-5}.

1. 4.56×10^{-4}

2. 2.28×10^{-5}

3. 1.14×10^{-5}

4. 2.28×10^{-4}

5. 4.56×10^{-5}

006   10.0 points

What is the molarity of a $FeSO_4$ solution if 25.0 mL of it reacts with 38.0 mL of 0.1214 M $KMnO_4$ solution?

$$MnO_4^- + 8\,H^+ + 5\,Fe^{2+} \rightarrow Mn^{2+} + 5\,Fe^{3+} + 4\,H_2O$$

1. 0.185 M

2. 0.0798 M

3. 0.923 M

4. 0.399 M

5. 0.426 M

007   10.0 points

What is the mass in grams of NH_3 titrated to the endpoint of a reaction with 10 mL of 0.02 N H_2SO_4?

$$H_2SO_4 + 2\,NH_3 \rightarrow SO_4^{-2} + 2\,NH_4^+$$
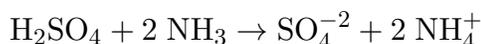
1. 0.0068 g

2. 0.0034 g

3. 0.0017 g

4. 0.0002 g

5. 0.0001 g

008   10.0 points

An animal cell assumes its normal volume when it is placed in a solution with a total solute molarity of 0.3 M. If the cell is placed in a solution with a total solute molarity of 0.1 M,

1. the escaping tendency of water in the cell increases.

2. water enters the cell, causing expansion.

3. water leaves the cell, causing contraction.

4. no movement of water takes place.

009   10.0 points

A decrease in temperature usually (decreases, increases, does not change) the solubility of salts in water.

1. increases

2. does not change

3. decreases

010   10.0 points

Rank the following compounds from most soluble to least soluble. Assume that all bonds except the OH are ionic. (You can estimate this ranking without using a calculator.)

Compound	K_{sp}
Bi_2S_3	1.0×10^{-97}
$Fe(OH)_2$	1.6×10^{-14}
PbI_2	2.6×10^{-13}
HgS	1.6×10^{-52}

1. $Fe(OH)_2 > PbI_2 > HgS > Bi_2S_3$

2. $HgS > PbI_2 > Fe(OH)_2 > Bi_2S_3$

3. $PbI_2 > Fe(OH)_2 > Bi_2S_3 > HgS$

4. $Bi_2S_3 > Fe(OH)_2 > HgS > PbI_2$

5. $PbI_2 > Fe(OH)_2 > HgS > Bi_2S_3$