KEY

Solutions Part 1

Name - _____

1.) Write an equation for the dissociation of each of the following in water.

a.) $BaCl_2$ (s) → Ba^{+2} (aq) + 2 Cl^- (aq)

b.) $AgNO_3$ (s) → Ag^+ (aq) + NO_3^- (aq)

c.) $Mg(OH)_2$ (s) → $Mg(OH)_2$ (s) (insoluble)

d.) Na_2SO_4 (s) → 2 Na^+ (aq) + SO_4^{-2} (aq)

e.) NH_4NO_3 (s) → NH_4^+ (aq) + NO_3^- (aq)

f.) $(NH_4)_3PO_4$ (s) → 3 NH_4^+ (aq) + PO_4^{-3} (aq)

2.) Which of the above solutions are electrical conductors?

Answer – All ionic compunds that dissociate into ions are good conductors.

3.) If $1.00\ L$ of a $1.00\ M$ solution of $AgNO_3$ was mixed, then;

1:1 ratio for each ion in dissociation.

a.) $[Ag^+]$ = $1.00\ M$

b.) $[NO_3^-]$ = $1.00\ M$

4.) If $500.\ mL$ of a $1.00\ M$ solution of $BaCl_2$ was mixed, then;

$BaCl_2$ (s) → Ba^{+2} (aq) + 2 Cl^- (aq)

a.) How many moles of Ba^{+2} are present? $0.500\ L \times \frac{1.00\ mol\ BaCl_2}{1\ L\ BaCl_2} \times \frac{1\ mol\ Ba^{+2}}{1\ mol\ BaCl_2} = 0.500\ mol\ Ba^{+2}$

b.) $[Ba^{+2}]$ = $\frac{0.500\ mol\ BaCl_2}{0.500\ L\ BaCl_2} \times \frac{1\ mol\ Ba^{+2}}{1\ mol\ BaCl_2} = 1.00\ M\ Ba^{+2}$

c.) How many moles of Cl^- are present? $0.500\ L \times \frac{1.00\ mol\ BaCl_2}{1\ L\ BaCl_2} \times \frac{2\ mol\ Cl^-}{1\ mol\ BaCl_2} = 1.00\ mol\ Cl^-$

d.) $[Cl^-]$ = $\frac{0.500\ mol\ BaCl_2}{0.500\ L\ BaCl_2} \times \frac{2\ mol\ Cl^-}{1\ mol\ BaCl_2} = 2.00\ M\ Cl^-$

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5.) If $500.mL$ of $1.00\ M$ NaCl was added to the solution in question 4, then;

a.) $[Ba^{+2}]$ =

First – Perform dilution calculations to find the new concentration of each solution after mixing.

$$[NaCl]_{dil} = \frac{(1.00)(0.500)}{(1.00)} \qquad [NaCl]_{dil} = 0.500\ M$$

$$[BaCl_2]_{dil} = \frac{(1.00)(0.500)}{(1.00)} \qquad [BaCl_2]_{dil} = 0.500\ M$$

Second - Below each dissociation equation indicate the ion's concentration

$$\underset{0.500\ M}{NaCl} \rightarrow \underset{0.500\ M}{Na^+} + \underset{0.500\ M}{Cl^-} \qquad \underset{0.500\ M}{BaCl_2} \rightarrow \underset{0.500\ M}{Ba^{+2}} + \underset{1.00\ M}{2\ Cl^-}$$

$[Ba^{+2}] = 0.500\ M$

b.) $[Cl^-] = 0.500 + 1.00 = 1.500\ M$