Revised May 2008

AP WORKED ANSWERS

2008B, 5

Points Guesstimate 2, 2, 2, 2, 2

(a) Transition metal ions are often colored. Cu^{2+} is blue, Ni^{2+} is green.

$Al(NO_3)_3 \bullet 9H_2O$	$BaCl_2 \bullet 2H_2O$	$CaCO_3$	~~$CuSO_4 \bullet 5H_2O$~~
NaCl	$BaSO_4$	~~$Ni(NO_3)_2 \bullet 6H_2O$~~	

(b) Calcium carbonate and barium sulfate are insoluble in water.

$Al(NO_3)_3 \bullet 9H_2O$	$BaCl_2 \bullet 2H_2O$	~~$CaCO_3$~~	~~$CuSO_4 \bullet 5H_2O$~~
NaCl	~~$BaSO_4$~~	~~$Ni(NO_3)_2 \bullet 6H_2O$~~	

(c) The formation of a white ppt. on the addition of $Ag^+_{(aq)}$ indicates the presence of $Cl^-_{(aq)}$ ions.

$Ag^+_{(aq)} + Cl^-_{(aq)} \rightarrow AgCl_{(s)}$

~~$Al(NO_3)_3 \bullet 9H_2O$~~	$BaCl_2 \bullet 2H_2O$	~~$CaCO_3$~~	~~$CuSO_4 \bullet 5H_2O$~~
NaCl	~~$BaSO_4$~~	~~$Ni(NO_3)_2 \bullet 6H_2O$~~	

(d) Heating hydrated salts causes the water in them to evaporate and as a result, they lose mass.

~~$Al(NO_3)_3 \bullet 9H_2O$~~	$BaCl_2 \bullet 2H_2O$	~~$CaCO_3$~~	~~$CuSO_4 \bullet 5H_2O$~~
~~NaCl~~	~~$BaSO_4$~~	~~$Ni(NO_3)_2 \bullet 6H_2O$~~	

(e) Adding an aqueous solution of hydrated copper(II) sulfate to an aqueous solution of hydrated barium chloride will cause a white precipitate of $BaSO_4$ to be formed.

$Ba^{2+}_{(aq)} + SO_4^{2-}{}_{(aq)} \rightarrow BaSO_{4(s)}$