

PRELIMINARY CHEMISTRY ASSESSMENT TASK

MARKING GUIDELINES

PART A: RESULTS

Reactants	Products	Observation	Precipitate
Barium Chloride + Magnesium Sulfate	Barium Sulfate + Magnesium Chloride	Cloudy liquid + fine powdery solid	Barium Sulfate
Magnesium Sulfate + Sodium Hydroxide	Magnesium Hydroxide + Sodium Sulfate	Transparent liquid + gelatinous cloudy solid	Magnesium Hydroxide
Sodium Hydroxide + Copper(II) Sulfate	Copper(II) Hydroxide + Sodium Sulfate	Transparent liquid + gelatinous blue solid	Copper(II) Hydroxide
Sodium Carbonate + Barium Chloride	Barium Carbonate + Sodium Chloride	Cloudy liquid + gelatinous transparent liquid	Barium Carbonate
Lead(II) Nitrate + Potassium Iodide	Lead(II) Iodide + Potassium Nitrate	Yellow liquid + fine powdery solid	Lead(II) Iodide
Lead(II) Nitrate + Sodium Carbonate	Lead(II) Carbonate + Sodium Nitrate	Milky liquid	Lead(II) Carbonate
Iron(II) Nitrate + Sodium Hydroxide	Iron(II) Hydroxide + Sodium Nitrate	Orange liquid + coarse solid particles	Iron(II) Hydroxide
Potassium Chromate + Iron(II) Nitrate	Iron(II) Chromate + Potassium Nitrate	Orange liquid + gelatinous transparent solid	Iron(II) Chromate

PART B: SAFETY

- Eye injury is reduced by wearing of safety glasses to prevent chemicals coming into contact with eyes
 - Gloves worn to reduce risk of staining / burning of hands to prevent chemicals coming into contact with hands.

PART C: CHEMICAL EQUATIONS

2. Chemical and Ionic Equations:

- Barium Chloride + Magnesium Sulfate → Barium Sulfate + Magnesium Chloride**

$$\text{BaCl}_{2(\text{aq})} + \text{MgSO}_{4(\text{aq})} \rightarrow \text{BaSO}_{4(\text{s})} + \text{MgCl}_{2(\text{aq})}$$

$$\text{Ba}^{2+}_{(\text{aq})} + 2\text{Cl}^{-}_{(\text{aq})} + \text{Mg}^{2+}_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \rightarrow \text{BaSO}_{4(\text{s})} + \text{Mg}^{2+}_{(\text{aq})} + 2\text{Cl}^{-}_{(\text{aq})}$$
- Magnesium Sulfate + Sodium Hydroxide → Magnesium Hydroxide + Sodium Sulfate**

$$\text{MgSO}_{4(\text{aq})} + 2\text{NaOH}_{(\text{aq})} \rightarrow \text{Mg(OH)}_{2(\text{s})} + \text{Na}_2\text{SO}_{4(\text{aq})}$$

$$\text{Mg}^{2+}_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} + 2\text{Na}^{+}_{(\text{aq})} + 2\text{OH}^{-}_{(\text{aq})} \rightarrow \text{Mg(OH)}_{2(\text{s})} + 2\text{Na}^{+}_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})}$$
- Sodium Hydroxide + Copper(II) Sulfate → Copper(II) Hydroxide + Sodium Sulfate**

$$2\text{NaOH}_{(\text{aq})} + \text{CuSO}_{4(\text{aq})} \rightarrow \text{Cu(OH)}_{2(\text{s})} + \text{Na}_2\text{SO}_{4(\text{aq})}$$

$$2\text{Na}^{+}_{(\text{aq})} + 2\text{OH}^{-}_{(\text{aq})} + \text{Cu}^{2+}_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \rightarrow \text{Cu(OH)}_{2(\text{s})} + 2\text{Na}^{+}_{(\text{aq})} + 2\text{SO}_4^{2-}_{(\text{aq})}$$
- Sodium Carbonate + Barium Chloride → Barium Carbonate + Sodium Chloride**

$$\text{Na}_2\text{CO}_{3(\text{aq})} + \text{BaCl}_{2(\text{aq})} \rightarrow \text{BaCO}_{3(\text{s})} + 2\text{NaCl}_{(\text{aq})}$$

$$2\text{Na}^{+}_{(\text{aq})} + \text{CO}_3^{2-}_{(\text{aq})} + \text{Ba}^{2+}_{(\text{aq})} + 2\text{Cl}^{-}_{(\text{aq})} \rightarrow \text{BaCO}_{3(\text{s})} + 2\text{Na}^{+}_{(\text{aq})} + 2\text{Cl}^{-}_{(\text{aq})}$$

- **Lead(II) Nitrate + Potassium Iodide → Lead(II) Iodide + Potassium Nitrate**

$$-\text{Pb}(\text{NO}_3)_2\text{(aq)} + 2\text{KI}\text{(aq)} \rightarrow \text{PbI}_{2(s)} + 2\text{KNO}_3\text{(aq)}$$

$$-\text{Pb}^{2+}\text{(aq)} + 2\text{NO}_3^-\text{(aq)} + 2\text{K}^+\text{(aq)} + 2\text{I}^-\text{(aq)} \rightarrow \text{PbI}_{2(s)} + 2\text{K}^+\text{(aq)} + 2\text{NO}_3^-\text{(aq)}$$
- **Lead(II) Nitrate + Sodium Carbonate → Lead(II) Carbonate + Sodium Nitrate**

$$-\text{Pb}(\text{NO}_3)_2\text{(aq)} + \text{Na}_2\text{CO}_3\text{(aq)} \rightarrow \text{PbCO}_{3(s)} + 2\text{NaNO}_3\text{(aq)}$$

$$-\text{Pb}^{2+}\text{(aq)} + 2\text{NO}_3^-\text{(aq)} + 2\text{Na}^+\text{(aq)} + \text{CO}_3^{2-}\text{(aq)} \rightarrow \text{PbCO}_{3(s)} + 2\text{Na}^{2+}\text{(aq)} + 2\text{NO}_3^-\text{(aq)}$$
- **Iron(II) Nitrate + Sodium Hydroxide → Iron(II) Hydroxide + Sodium Nitrate**

$$-\text{Fe}(\text{NO}_3)_2\text{(aq)} + 2\text{NaOH}\text{(aq)} \rightarrow \text{Fe(OH)}_{2(s)} + 2\text{NaNO}_3\text{(aq)}$$

$$-\text{Fe}^{2+}\text{(aq)} + 2\text{NO}_3^-\text{(aq)} + 2\text{Na}^+\text{(aq)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{Fe(OH)}_{2(s)} + 2\text{Na}^+\text{(aq)} + 2\text{NO}_3^-\text{(aq)}$$
- **Potassium Chromate + Iron(II) Nitrate → Iron(II) Chromate + Potassium Nitrate**

$$-\text{K}_2\text{CrO}_4\text{(aq)} + \text{Fe}(\text{NO}_3)_2\text{(aq)} \rightarrow \text{FeCrO}_{4(s)} + 2\text{KNO}_3\text{(aq)}$$

$$-2\text{K}^+\text{(aq)} + \text{CrO}_4^{2-}\text{(aq)} + \text{Fe}^{2+} + 2\text{NO}_3^- \rightarrow \text{FeCrO}_{4(s)} + 2\text{K}^+ + 2\text{NO}_3^-\text{(aq)}$$

3. – Spectator ions are those ions which do not take part in the reaction and exist in the same form in the reactant and product section of the ionic equation.

– Marker's individual discretion for examples

4. Net Ionic Equations:

- **Barium Chloride + Magnesium Sulfate → Barium Sulfate + Magnesium Chloride**

$$-\text{Ba}^{2+}\text{(aq)} + \text{SO}_4^{2-}\text{(aq)} \rightarrow \text{BaSO}_{4(s)}$$
- **Magnesium Sulfate + Sodium Hydroxide → Magnesium Hydroxide + Sodium Sulfate**

$$-\text{Mg}^{2+}\text{(aq)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{Mg(OH)}_{2(s)}$$
- **Sodium Hydroxide + Copper(II) Sulfate → Copper(II) Hydroxide + Sodium Sulfate**

$$-2\text{OH}^-\text{(aq)} + \text{Cu}^{2+}\text{(aq)} \rightarrow \text{Cu(OH)}_{2(s)}$$
- **Sodium Carbonate + Barium Chloride → Barium Carbonate + Sodium Chloride**

$$-\text{Ba}^{2+}\text{(aq)} + \text{CO}_3^{2-}\text{(aq)} \rightarrow \text{BaCO}_{3(s)}$$
- **Lead(II) Nitrate + Potassium Iodide → Lead(II) Iodide + Potassium Nitrate**

$$-\text{Pb}^{2+}\text{(aq)} + 2\text{I}^-\text{(aq)} \rightarrow \text{PbI}_{2(s)}$$
- **Lead(II) Nitrate + Sodium Carbonate → Lead(II) Carbonate + Sodium Nitrate**

$$-\text{Pb}^{2+}\text{(aq)} + \text{CO}_3^{2-}\text{(aq)} \rightarrow \text{PbCO}_{3(s)}$$
- **Iron(II) Nitrate + Sodium Hydroxide → Iron(II) Hydroxide + Sodium Nitrate**

$$-\text{Fe}^{2+}\text{(aq)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{Fe(OH)}_{2(s)}$$
- **Potassium Chromate + Iron(II) Nitrate → Iron(II) Chromate + Potassium Nitrate**

$$-\text{Fe}^{2+} + \text{CrO}_4^{2-}\text{(aq)} \rightarrow \text{FeCrO}_{4(s)}$$

PART D: APPLICATION

5. – Marker's individual discretion