



Piqua Invitational
Chemical ID
January 8th, 2005

School: _____

Names: _____

Team Number: _____

PART I-A. (10 points each)

Based on your selection of AgNO₃, NaOH, HCl or Phenolphthalein, identify each of the following 10 samples.

Sodium Bicarbonate
Sodium Sulfite
Magnesium Hydroxide
Calcium Carbonate
Sodium Dihydrogen Phosphate

Ammonium Chloride
Zinc Chloride
Sodium Iodide
Potassium Hydroxide
Aluminum Nitrate

Indicator Selected: _____

	Chemical Formula:	Chemical Name:
Sample # 1	Na ₂ SO ₃	Sodium Sulfite
Sample # 2	NH ₄ Cl	Ammonium Chloride
Sample # 3	NaI	Sodium Iodide
Sample # 4	CaCO ₃	Calcium Carbonate
Sample # 5	Al(NO ₃) ₃	Aluminum Nitrate
Sample # 6	Mg(OH) ₂	Magnesium Hydroxide
Sample # 7	NaHCO ₃	Sodium Bicarbonate
Sample # 8	ZnCl ₂	Zinc Chloride
Sample # 9	KOH	Potassium Hydroxide
Sample # 10	NaH ₂ PO ₄	Sodium Dihydrogen Phosphate



Piqua Invitational
Chemical ID
January 8th, 2005

School: _____

Names: _____

Team Number: _____

Part I-B: (15 points)

Provide a detailed and organized formal qualitative analysis flow chart, dichotomous key, or table documenting the logic of your testing procedures.



Piqua Invitational
Chemical ID
January 8th, 2005

School: _____

Names: _____

Team Number: _____

Part II (1 1/2 points each)

Balance the following equations and provide the net ionic equations

REACTIONS	BALANCED EQUATION	NET IONIC EQUATION
$\text{AgNO}_3 + \text{ZnCl}_2(aq)$	$2\text{AgNO}_3(aq) + \text{ZnCl}_2(aq) \rightarrow 2\text{AgCl}(s) + \text{Zn}(\text{NO}_3)_2(aq)$	$\text{Ag}^+(aq) + \text{Cl}^-(aq) \rightarrow \text{AgCl}(s)$
$\text{AgNO}_3(aq) + \text{KOH}(aq)$	$\text{AgNO}_3(aq) + \text{KOH}(aq) \rightarrow \text{AgOH}(s) + \text{KNO}_3(aq)$	$\text{Ag}^+(aq) + \text{OH}^-(aq) \rightarrow \text{AgOH}(s)$
$\text{AgNO}_3(aq) + \text{NaI}(aq)$	$\text{AgNO}_3(aq) + \text{NaI}(aq) \rightarrow \text{AgI}(s) + \text{NaNO}_3(aq)$	$\text{Ag}^+(aq) + \text{I}^-(aq) \rightarrow \text{AgI}(s)$
$\text{AgNO}_3(aq) + \text{HCl}(aq)$	$\text{AgNO}_3(aq) + \text{HCl}(aq) \rightarrow \text{AgCl}(s) + \text{HNO}_3(aq)$	$\text{Ag}^+(aq) + \text{Cl}^-(aq) \rightarrow \text{AgCl}(s)$
$\text{NaOH}(aq) + \text{ZnCl}_2(aq)$	$2\text{NaOH}(aq) + \text{ZnCl}_2(aq) \rightarrow \text{Zn}(\text{OH})_2(s) + 2\text{NaCl}(aq)$	$\text{Zn}^{++}(aq) + 2\text{OH}^-(aq) \rightarrow \text{Zn}(\text{OH})_2(s)$
$\text{NaOH}(aq) + \text{Al}(\text{NO}_3)_3(aq)$	$3\text{NaOH}(aq) + \text{Al}(\text{NO}_3)_3(aq) \rightarrow 3\text{NaNO}_3(aq) + \text{Al}(\text{OH})_3(s)$	$\text{Al}^{+++}(aq) + 3\text{OH}^-(aq) \rightarrow \text{Al}(\text{OH})_3(s)$
$\text{HCl}(aq) + \text{KOH}(aq)$	$\text{HCl}(aq) + \text{KOH}(aq) \rightarrow \text{KCl}(aq) + \text{H}_2\text{O}(l)$	$\text{H}^+(aq) + \text{OH}^-(aq) \rightarrow \text{H}_2\text{O}(l)$
$\text{HCl}(aq) + \text{NaHCO}_3(aq)$	$\text{HCl}(aq) + \text{NaHCO}_3(aq) \rightarrow \text{H}_2\text{O}(l) + \text{CO}_2(g) + \text{NaCl}(aq)$	$\text{H}^+(aq) + \text{HCO}_3^-(aq) \rightarrow \text{H}_2\text{O}(l) + \text{CO}_2(g)$
$\text{HCl}(aq) + \text{NaI}(aq)$	No Reaction	No Reaction
$\text{HCl}(aq) + \text{Na}_2\text{SO}_3(aq)$	$2\text{HCl}(aq) + \text{Na}_2\text{SO}_3(aq) \rightarrow \text{H}_2\text{SO}_3(aq) + 2\text{NaCl}(aq)$ immediately changing to $\text{H}_2\text{O}(l) + \text{SO}_2(g) + 2\text{NaCl}(aq)$ (need either the entire formula or the bottom line. Top line only is unstable)	$\text{Na}_2\text{SO}_3(aq) + 2\text{H}^+(aq) \rightarrow \text{H}_2\text{O}(l) + \text{SO}_2(g) + 2\text{Na}^+(aq)$
$\text{HCl}(aq) + \text{CaCO}_3(s)$	$2\text{HCl}(aq) + \text{CaCO}_3(s) \rightarrow \text{H}_2\text{CO}_3(aq) + \text{CaCl}_2(aq)$ immediately changing to $\text{H}_2\text{O}(l) + \text{CO}_2(g) + \text{CaCl}_2(aq)$ (need either the entire formula or the bottom line. Top line only is unstable)	$\text{H}^+(aq) + \text{CaCO}_3(s) \rightarrow \text{H}_2\text{CO}_3(aq) + \text{Ca}^{++}(aq)$ immediately changing to $\text{H}_2\text{O}(l) + \text{CO}_2(g) + \text{Ca}^{++}(aq)$ (need either the entire formula or the bottom line. Top line only is unstable)
$\text{HCl}(aq) + \text{Mg}(\text{OH})_2(aq)$	$2\text{HCl}(aq) + \text{Mg}(\text{OH})_2(aq) \rightarrow \text{MgCl}_2(aq) + 2\text{H}_2\text{O}(l)$	$\text{H}^+(aq) + \text{Mg}(\text{OH})_2(aq) \rightarrow \text{H}_2\text{O}(l) + \text{Mg}^{++}(aq)$