

Name: _____

Period: _____

Seat#: _____

Directions:

- Use the following information and the chart to help you walk through the thought process that is needed in order to determine if a salt is acidic, basic, or neutral

<ul style="list-style-type: none"> ▪ Strong Acid $\xrightarrow{\text{turns into a}}$ Weak Conjugate Base (not much effect on pH) ▪ Weak Acid $\xrightarrow{\text{turns into a}}$ Strong Conjugate Base (potential effect on pH) 	<ul style="list-style-type: none"> ▪ Strong Base $\xrightarrow{\text{turns into a}}$ Weak Conjugate Acid (not much effect on pH) ▪ Weak Base $\xrightarrow{\text{turns into a}}$ Strong Conjugate Acid (potential effect on pH)
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<ul style="list-style-type: none"> ▪ Ion from a Strong Acid $\xrightarrow{\text{makes the sol'n}}$ Neutral (is a weak conj. base) ▪ Ion from a Weak Acid $\xrightarrow{\text{makes the sol'n}}$ Basic (is a strong conj. base) 	<ul style="list-style-type: none"> ▪ Ion from a Strong Base $\xrightarrow{\text{makes the sol'n}}$ Neutral (is a weak conj. acid) ▪ Ion from a Weak Base $\xrightarrow{\text{makes the sol'n}}$ Acidic (is a strong conj. acid)
<ul style="list-style-type: none"> ▪ Cation is a charged metal ion, and anion is from a strong acid $\xrightarrow{\text{makes a}}$ Acidic metal hydrate + Neutral anion - salt is acidic 	

<ul style="list-style-type: none"> ▪ Neutral + Acidic = Acidic ▪ Acidic + Basic = ? Use K_a and K_b to determine ▪ $K_w = K_a \times K_b$ $K_w = 1.0 \times 10^{-14}$ (if at 25 °C, may be different if not at 25°C) 	<ul style="list-style-type: none"> ▪ Neutral + Basic = Basic <li style="padding-left: 20px;">$K_a > K_b \rightarrow$ Acidic <li style="padding-left: 20px;">$K_a < K_b \rightarrow$ Basic <li style="padding-left: 20px;">$K_a = K_b \rightarrow$ Neutral 	<ul style="list-style-type: none"> ▪ Neutral + Neutral = Neutral
<p>If you are looking for the K_a of an acidic conjugate ion, use K_w and the K_b of the base it came from</p> $K_{\text{acidic conj. ion}} = \frac{K_w}{K_b \text{ (of the base that the ion came from)}}$		
<p>If you are looking for the K_b of a basic conjugate ion, use K_w and the K_a of the acid it came from</p> $K_{\text{basic conj. ion}} = \frac{K_w}{K_a \text{ (of the acid that the ion came from)}}$		

Dougherty Valley HS Chemistry
Acids & Bases – Salts

7 Strong Acids (H ⁺) All other acids are weak		8 Strong Bases (OH ⁻) All other bases are weak	
Hydrochloric acid	HCl	Lithium hydroxide	LiOH
Hydrobromic acid	HBr	Sodium hydroxide	NaOH
Hydroiodic	HI	Potassium hydroxide	KOH
Perchloric acid	HClO ₄	Rubidium hydroxide	RbOH
Chloric acid	HClO ₃	Cesium hydroxide	CsOH
Nitric acid	HNO ₃	Calcium hydroxide	Ca(OH) ₂
Sulfuric acid	H ₂ SO ₄	Strontium hydroxide	Sr(OH) ₂
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Dougherty Valley High School Chemistry — Weak Acid/Base Reference Sheet
Acid Dissociation Constant (K_a) Values for Some Weak Acids

Weak Acid	Chemical Formula	K _a
acetic	HC ₂ H ₃ O ₂	1.8 x 10 ⁻⁵
arsenic	H ₃ AsO ₄	5.6 x 10 ⁻³
arsenous	HAsO ₂	6 x 10 ⁻¹⁰
ascorbic	H ₂ C ₆ H ₆ O ₆	8.0 x 10 ⁻⁵
benzoic	C ₆ H ₅ COOH	6.5 x 10 ⁻⁵
boric	H ₃ BO ₃	5.8 x 10 ⁻¹⁰
carbonic	H ₂ CO ₃	4.3 x 10 ⁻⁷
chloroacetic	CH ₂ ClCOOH	1.4 x 10 ⁻³
citric	H ₃ C ₆ H ₅ O ₇	7.4 x 10 ⁻⁴
formic	HCOOH	1.8 x 10 ⁻⁴
hydrazoic	HN ₃	1.9 x 10 ⁻⁵
hydrocyanic	HCN	4.9 x 10 ⁻¹⁰
hydrofluoric	HF	6.8 x 10 ⁻⁴
hydrosulfuric	H ₂ S	5.7 x 10 ⁻⁸
hypobromous	HBrO	2 x 10 ⁻⁹
hypochlorous	HClO	3.0 x 10 ⁻⁸
hydrogen peroxide	H ₂ O ₂	2.4 x 10 ⁻¹²
iodic	HIO ₃	1.7 x 10 ⁻¹
malonic	H ₂ C ₃ H ₂ O ₄	1.5 x 10 ⁻³
nitrous	HNO ₂	4.5 x 10 ⁻⁴
oxalic	H ₂ C ₂ O ₄	5.9 x 10 ⁻²
phosphoric	H ₃ PO ₄	7.5 x 10 ⁻³
selenous	H ₂ SeO ₃	5.3 x 10 ⁻⁹
sulfurous	H ₂ SO ₃	1.7 x 10 ⁻²
tartaric	H ₂ C ₄ H ₄ O ₆	1.0 x 10 ⁻³

Base Dissociation Constant (K_b) Values for Some Weak Bases

Weak Base	Chemical Formula	K _b
ammonia	NH ₃	1.8 x 10 ⁻⁵
aniline	C ₆ H ₅ NH ₂	4.3 x 10 ⁻¹⁰
dimethylamine	(CH ₃) ₂ NH	5.4 x 10 ⁻⁴
ethylamine	C ₂ H ₅ NH ₂	6.4 x 10 ⁻⁴
hydrazine	N ₂ H ₄	1.3 x 10 ⁻⁶
hydroxylamine	HONH ₂	1.1 x 10 ⁻⁶
methylamine	CH ₃ NH ₂	4.4 x 10 ⁻⁴
pyridine	C ₅ H ₅ N	1.7 x 10 ⁻⁹
trimethylamine	(CH ₃) ₃ N	6.4 x 10 ⁻⁵

Dougherty Valley HS Chemistry
Acids & Bases – Salts

Salt		Cation came from...	So Cation makes the solution...	Anion came from...	So Anion makes the solution...	So Salt is...Acidic, Basic, or Neutral?
NH ₄ CN						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
NaNO ₂						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
NH ₄ OCl						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
CH ₃ NH ₃ CN						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	

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Salt		Cation came from...	So Cation makes the solution...	Anion came from...	So Anion makes the solution...	So Salt is...Acidic, Basic, or Neutral?
KF						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
NH ₄ NO ₂						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
HONH ₃ ClO ₄						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
Na ₂ CO ₃						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	

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Salt		Cation came from...	So Cation makes the solution...	Anion came from...	So Anion makes the solution...	So Salt is...Acidic, Basic, or Neutral?
NaBr						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	
C ₆ H ₅ NH ₃ Cl						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	
LiC ₂ H ₃ O ₂						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	
Na ₂ SO ₃						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	<u>Which is a:</u>	<u>Ka_(ion) or Kb_(ion) if needed:</u>	

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Salt		Cation came from...	So Cation makes the solution...	Anion came from...	So Anion makes the solution...	So Salt is...Acidic, Basic, or Neutral?
$K_2C_2O_4$						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	
$NaOBr$						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	
$(CH_3NH_3)H_2PO_4$						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	
NH_4I						<i>Think it through...</i>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	<u>Which is a:</u>	<u>$Ka_{(ion)}$ or $Kb_{(ion)}$ if needed:</u>	

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Salt		Cation came from...	So Cation makes the solution...	Anion came from...	So Anion makes the solution...	So Salt is...Acidic, Basic, or Neutral?
KNO ₂						<u>Think it through...</u>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	
C ₂ H ₅ NH ₃ Cl						<u>Think it through...</u>
<u>Cation is:</u>	<u>Anion is:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	<u>Which is a:</u>	<u>K_{a(ion)} or K_{b(ion)} if needed:</u>	

