

Name _____ Block: _____ Date: _____

Chemistry 12

STRENGTHS OF ACIDS & BASES

KEY

- What is the strongest acid that can exist in aqueous solution? H_3O^+
- What is the strongest base that can exist in aqueous solution? OH^-
- What would have the higher $[\text{H}_3\text{O}^+]$ in water, 10.0 M HClO_4 or 1.0 M HClO_4 ?
10.0 M HClO_4
- What would have the higher $[\text{H}_3\text{O}^+]$ in water, 10.0 M HClO_4 or 10.0 M HNO_2 ?
10.0 M HClO_4
- What would have the higher $[\text{H}_3\text{O}^+]$ in water, 1.0 M HIO_3 or 1.0 M H_2SO_3 ?
1.0 M HIO_3
- What would have the higher $[\text{H}_3\text{O}^+]$ in water, 1.0 M NH_4^+ or 1.0 M HF ?
1.0 M HF
- Which is the stronger acid, HSO_3^- or HC_2O_4^- ? HC_2O_4^-
- Which is the stronger acid, HSO_3^- or HSO_4^- ? HSO_4^-
- Which is the stronger acid, HPO_4^{2-} or HSO_3^- ? HSO_3^-
- Which is the stronger base, HPO_4^{2-} or HSO_3^- ? HPO_4^{2-}
- Which is the stronger base, HSO_3^- or HSO_4^- ? HSO_3^-
- Which is the stronger base, HCO_3^- or HCOO^- ? HCO_3^-
- Classify each of the following as: a strong acid (SA), weak acid (WA), strong base (SB), weak base (WB) or a spectator ion (S).

a) F^-	___ <u>WB</u> ___	f) Cl^-	___ <u>S</u> ___
b) HIO_3	___ <u>WA</u> ___	g) NH_3	___ <u>WB</u> ___
c) NO_3^-	___ <u>S</u> ___	h) O^{2-}	___ <u>SB</u> ___
d) HClO_4	___ <u>SA</u> ___	i) CH_3COOH	___ <u>WA</u> ___
e) $\text{C}_2\text{O}_4^{2-}$	___ <u>WB</u> ___	j) ClO_4^-	___ <u>S</u> ___
- If 0.10 M HSO_3^- is mixed with 0.10 M HC_2O_4^- , which species will *donate* a proton?
- If 0.10 M HSO_4^- is mixed with 0.10 M $\text{HC}_6\text{H}_5\text{O}_7^{2-}$, which species will *donate* a proton?
- If 0.10 M HSO_3^- is mixed with 0.10 M $\text{HC}_6\text{H}_5\text{O}_7^{2-}$, which species will *donate* a proton?

17. If 0.10 M HCO_3^- is mixed with 0.10 M HC_2O_4^- , which species will **accept** a proton?

18. If 0.10 M HS^- is mixed with 0.10 M NO_2^- , which species will **accept** a proton?

19. If 0.10 M H_2SO_4 is mixed with 0.10 M HPO_4^{2-} , which species will **accept** a proton?

20. Write the balanced equation which describes the equilibrium present when 0.1 M H_2SO_3 is mixed with 0.1 M NO_2^- .



b) For this reaction, equilibrium tends to favour the (reactants/products)? products

c) For this reaction the value of K_{eq} is (<1, >1 or about =1) >1

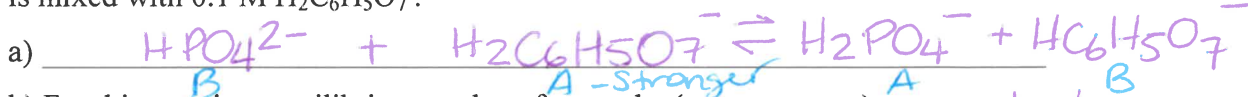
21. Write the balanced equation which describes the equilibrium present when 0.1 M HSO_3^- is mixed with 0.1 M HC_2O_4^-



b) For this reaction, equilibrium tends to favour the (reactants/products) reactants

c) For this reaction the value of K_{eq} is (<1, >1 or about =1) <1

22. Write the balanced equation which describes the equilibrium present when 0.1 M HPO_4^{2-} is mixed with 0.1 M $\text{H}_2\text{C}_6\text{H}_5\text{O}_7^-$.



b) For this reaction, equilibrium tends to favour the (reactants/products) products

c) For this reaction the value of K_{eq} is (<1, >1 or about =1) >1

23. The K_{eq} for the reaction: $\text{HA}_2\text{B} + \text{CD}^- \rightleftharpoons \text{HCD} + \text{A}_2\text{B}^-$ is **0.0020** <1

a) Which is the stronger conjugate acid in the above equilibrium? HCD

b) Which is the stronger conjugate base in the above equilibrium? A₂B⁻

24. The K_{eq} for the reaction: $\text{H}_2\text{X} + \text{YZ}^- \rightleftharpoons \text{HYZ} + \text{HX}^-$ is **3.4×10^5** >1

a) Which is the stronger conjugate acid in the above equilibrium? H₂X

b) Which is the stronger conjugate base in the above equilibrium? YZ⁻