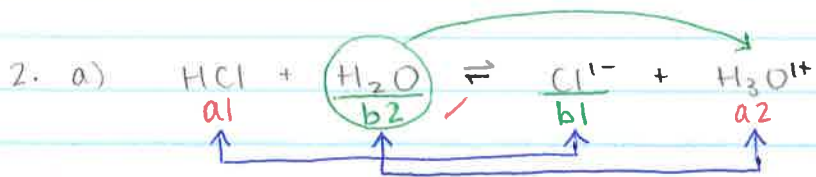
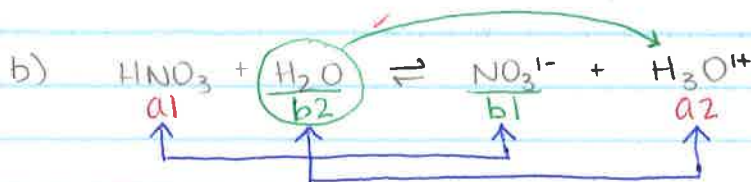


Acid Base Equilibrium Questions

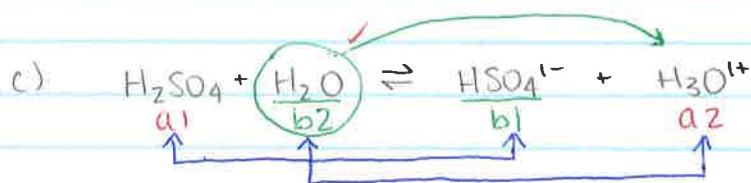
Jan. 20th



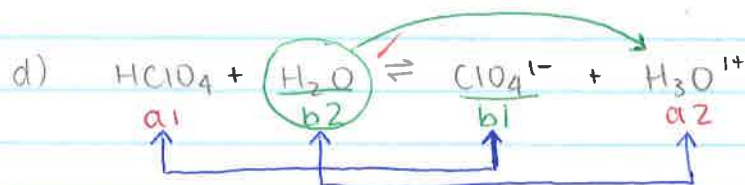
- lies right ✓  
 - H<sub>3</sub>O<sup>+</sup> ∴ acidic ✓



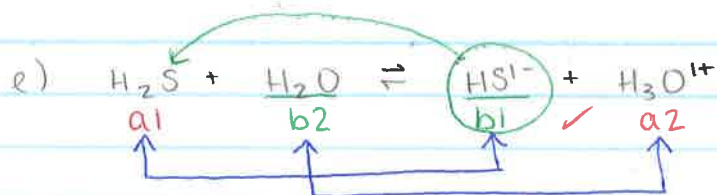
- lies right ✓  
 - acidic ✓



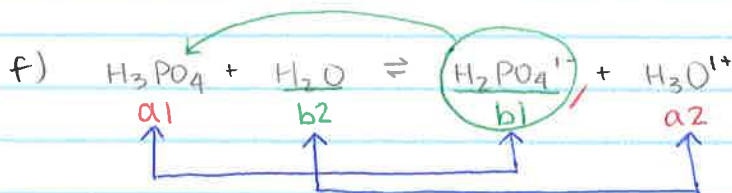
- lies right ✓  
 - acidic ✓



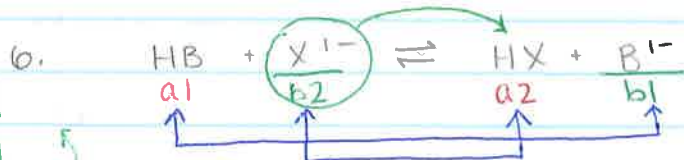
- lies right ✓  
 - acidic ✓



- lies left ✓  
 - acidic ✓



- lies left ✓  
 - acidic ✓

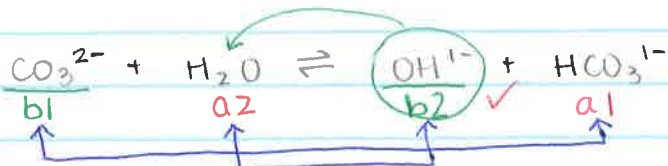
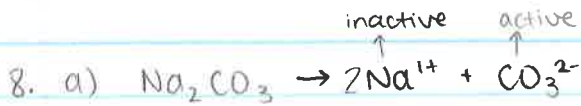


- lies very far to the right

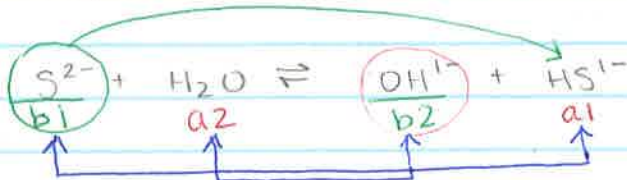
S: ↑[B<sup>-</sup>]  
 R: ↓[B<sup>-</sup>]  
 H: use B<sup>-</sup>  
 D: shift left

- a) X<sup>-</sup> and B<sup>-</sup> are competing for protons
- b) X<sup>-</sup> is stronger because it becomes HX more
- c) HX is weaker because it stays HX instead of donating protons
- d) K for this system will have a large value because [products] > [reactants] as it lies far to the right.  $K = \frac{[\text{HX}][\text{B}^-]}{[\text{HB}][\text{X}^-]}$
- e) NaB will dissociate into Na<sup>+</sup> and B<sup>-</sup>; an addition of B<sup>-</sup> will result in an increase in HB, ∴ shifting slightly left

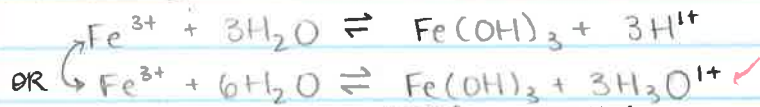
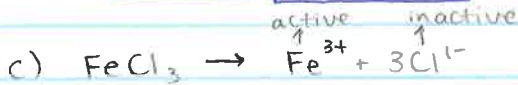
the stronger the base, the weaker the conjugate acid



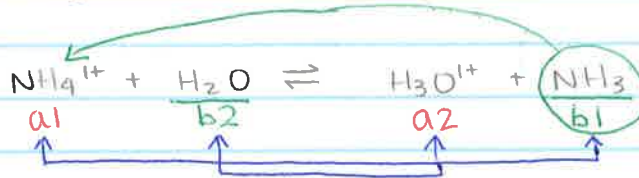
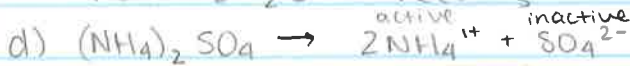
- shift left ✓  
-  $\text{OH}^{1-} \therefore$  basic ✓



- shift right ✗  
- basic ✓

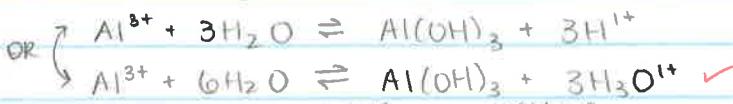


- acidic ( $\text{H}^{1+}$ )  
- acidic ( $\text{H}_3\text{O}^{1+}$ ) ✓

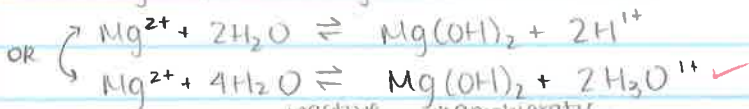
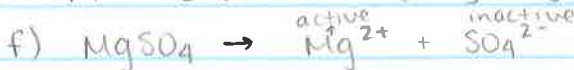


- shift left ✓  
- acidic ✓

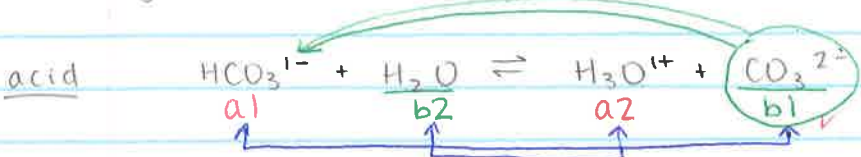
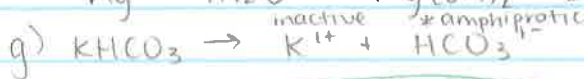
\*SO we aren't basing  $\text{SO}_4^{2-}$  off the answers? It is inactive?



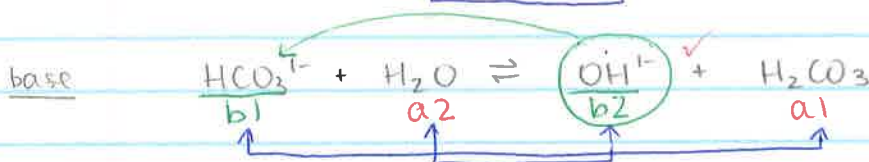
- acidic ( $\text{H}^{1+}$ )  
- acidic ( $\text{H}_3\text{O}^{1+}$ ) ✓



- acidic ( $\text{H}^{1+}$ )  
- acidic ( $\text{H}_3\text{O}^{1+}$ ) ✓



- shift more left ✓  
- acidic



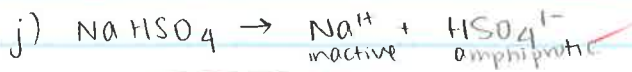
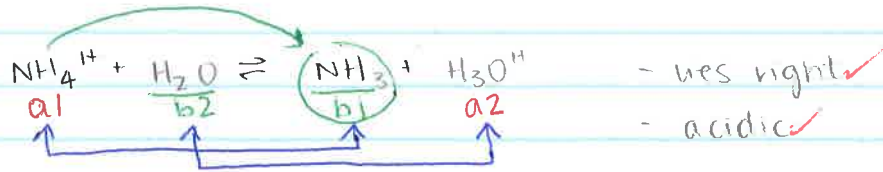
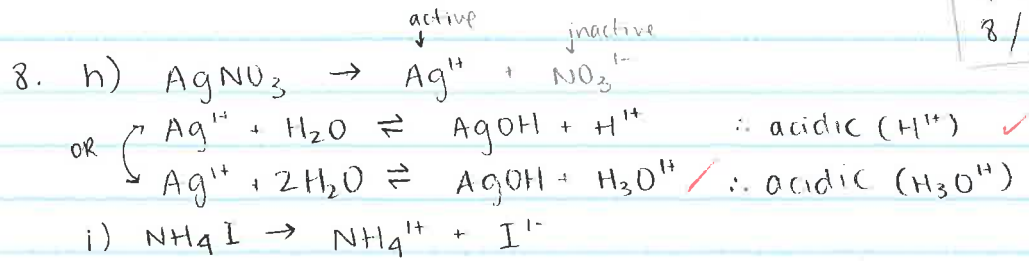
- shift left ✓  
- basic

$[\text{OH}^{1-}] > [\text{H}_3\text{O}^{1+}]$   
 $\therefore$  BASIC ✓

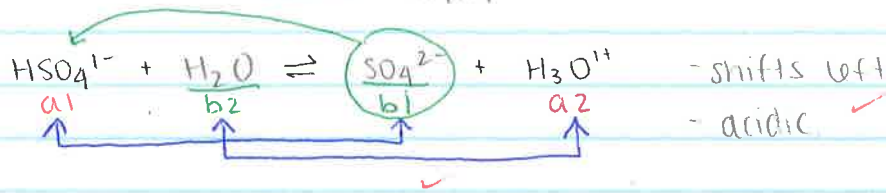
exam : 

2/a, b, c or d	4
8/a, Na <sub>2</sub> CO <sub>3</sub> , KF	5
8/ c, h	3
8/ g	9

 12b

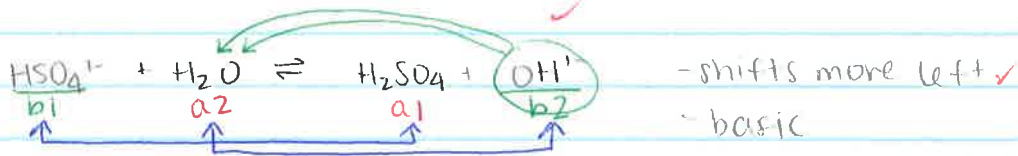


as acid



\* conjugate pair stuff not shown in answer

as base



$[\text{H}_3\text{O}^+] > [\text{OH}^-]$   
 $\therefore \text{ACIDIC}$  ✓

1. a) Cl<sup>-</sup> ✓
- b) CH<sub>3</sub><sup>-</sup> ✓
- c) SO<sub>3</sub><sup>2-</sup> ✓
- d) HSO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup> \* ✓
- e) NH<sub>2</sub><sup>-</sup> ✓
- f) ClO<sub>4</sub><sup>-</sup> ✓