

## AP WORKSHEET 04BEGHI: Reactions Summary

### 1. Electrolytes & Non-electrolytes

Indicate if you would expect the following compounds to be electrolytes or non-electrolytes when in aqueous solution (dissolved in water). In each case **very briefly** explain your answer. **Use equations if appropriate.** (6)

(a) Sodium fluoride

(b) Methanol ( $\text{CH}_3\text{OH}$ , an alcohol similar to ethanol – **NOT a hydroxide**)

(c) Strontium nitrate

### 2. Ionic concentrations

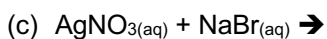
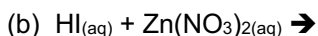
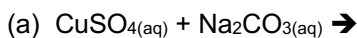
Calculate the concentration of the ion indicated in each of the following solutions. The use of square brackets [ ] denotes concentration in  $\text{mol L}^{-1}$ . (3)

(a)  $[\text{K}^+]$  in 0.238 M  $\text{KNO}_3$

(b)  $[\text{Al}^{3+}]$  and  $[\text{SO}_4^{2-}]$  in 0.080 M  $\text{Al}_2(\text{SO}_4)_3$

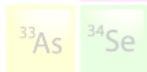
### 3. Precipitation reactions and net ionic equations

Predict if a precipitation reaction will occur in each of the following cases. If it does, write the full, balanced equation **AND** the net ionic equation (**including state symbols**) to show the formation of the precipitate. If there is no reaction, say so, and indicate why. (9)



### 4. Acids and bases & neutralization

(a) Write a full, balanced equation for the reaction of aqueous sulfuric acid and aqueous cesium hydroxide to produce an aqueous salt and water **assuming that sulfuric acid donates BOTH of its hydrogen ions**. Include state symbols. (2)



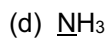
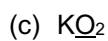
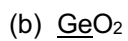
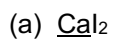
Chemistry Pages

(b) Rewrite the equation in (a) showing **all ions** present **with** state symbols. (2)

(c) Rewrite the equation in (b) removing any spectator ions (**i.e. write the net ionic equation**) **with** state symbols. (2)

## 5. Oxidation numbers

What is the oxidation number of each of the underlined atoms in each of the following species? Think carefully about the rules that are being applied and write a **very brief, simple explanation** of your answer in each case. (8)



## 6. REDOX and half equations

For each of the following ionic solids, write a balanced overall equation to show their formation from their elements. Then write the two balanced half equations (one showing oxidation, one showing reduction) that show the formation of the individual ions involved. (9)

(a) Magnesium sulfide

**OVERALL:**

**OXIDATION:**

**REDUCTION:**

(b) Sodium bromide

**OVERALL:**

**OXIDATION:**

**REDUCTION:**

(c) Aluminum chloride

**OVERALL:**

**OXIDATION:**

**REDUCTION:**

## 7. Disproportionation

(a) Consider the following reaction.



Write two balanced half equations (one oxidation, one reduction) to show the changes that the chlorine species undergoes. (4)

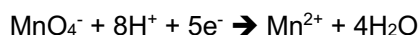
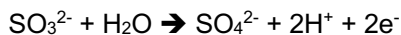
**OXIDATION:**

**REDUCTION:**

(b) Is this reaction a disproportionation? Justify your answer. (2)

## 8. REDOX Titration calculations

(a) Consider the following half equations.



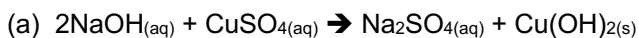
Combine these two equations to obtain the overall reaction of sulfite ions with manganate (VII) ions. (2)

(b) Use the equation you have written in (a) to calculate the volume of 0.277 M manganate (VII) ions that are required to react completely with 20.0 mL of 0.451 M sulfite ions. (4)

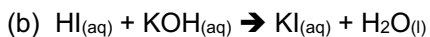
### 9. Classification of chemical reactions

By choosing **two** of the following reaction types from the list below, classify each of the following reactions in **two ways**. (12)

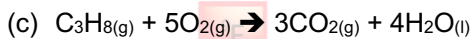
**Reaction types: precipitation, acid-base, REDOX (oxidation and reduction), single displacement, double displacement, combination, decomposition, combustion.**



**AND**



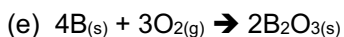
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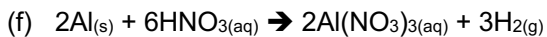
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