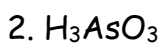


## CHAPTER 19: Station 9 - Acids & Bases

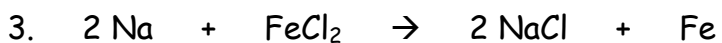
1. If a solution has a  $[H^+]$  concentration of  $4.5 \times 10^{-7} \text{ M}$ , is this an acidic or basic solution? Explain.
2. What is the  $[H^+]$  of a solution having a pH of 3.4?
3. Determine the pOH of a  $4.5 \times 10^{-3} \text{ M}$   $[OH^-]$  concentration of KOH solution.
4. Determine the pOH of a HBr solution with a pH of 4.4.

## CHAPTER 20: Station 10 - Oxidation & Reduction

Determine the oxidation number of each element in each compound:



In each of the following equations, indicate the element that has been oxidized and the one that has been reduced. Also note the oxidizing agent and reducing agent:



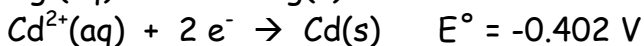
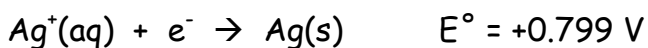
## CHAPTER 21 - Station 11: Electrochemical Cell & Cell Potential

Questions # 1-3 are about this cell:  $\text{Al}/\text{Al}^{3+} \parallel \text{Pb}^{2+}/\text{Pb}$  and the respective cell potentials are -1.66V and -0.13V.

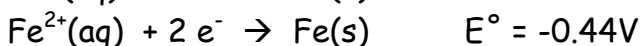
1. Sketch the voltaic cell (battery) and label all the components. (+/- electrode, oxidized/reduced, salt bridge, direction of electron flow, direction of ion flow)
2. Identify the anode and the cathode. Write the half reactions and the balanced overall cell reaction. List the cell potentials for each element.

3. What is the standard cell potential for:

$\text{Cd(s)} + 2 \text{Ag}^+(\text{aq}) \rightarrow \text{Cd}^{2+}(\text{aq}) + 2 \text{Ag(s)}$ , where:



4. What is the standard cell potential of the following cell:



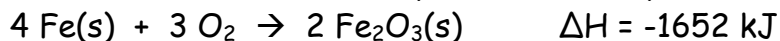
## CHAPTER 17: Station 12 - Thermochemistry Conversions & Enthalpy

1. Convert 0.890 kilocalories to joules.
2. If 20.0 g of water absorbs 1,672 J of heat, what will be the change in temperature?
3. How much heat is given out when 85.0 g of lead cools from 200.0°C to 10.0°C? The specific heat of lead is 0.129 J/g°C.
4. If it takes 41.72 J to heat a piece of gold weighing 18.69 g from 10.0°C to 27.0°C, what is the specific heat of the gold?

## CHAPTER 17: Station 13 - Enthalpy Changes & Heat of Phase Changes

For questions # 1 and 2, use the following information:

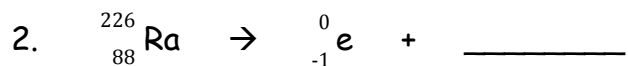
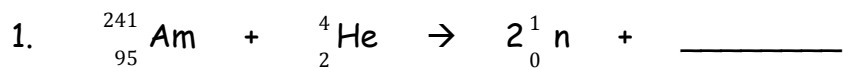
The overall reaction in commercial heat packs can be represented as:



1. How much heat is released when 4.00 mol of iron is reacted with excess oxygen?
2. How much heat is released when 2.00 g of  $\text{O}_2$  is reacted?
3. How much heat is required to boil 2.5 moles of ethanol?  
( $\Delta H_{\text{vap}} = 38.6 \text{ kJ/mol}$ )
4. How much heat is transferred when 400 grams of mercury is frozen?  
( $\Delta H_{\text{fus}} = 2.29 \text{ kJ/mol}$ )

## CHAPTER 25: Station 14 - Nuclear Chemistry

Complete the following nuclear equations and identify what type of decay they are undergoing:



3. A 208 g sample of sodium-24 decays to 13.0 g of sodium-24 within 60.0 h. What is the half-life of this radioactive isotope?

4. If we start with 8000 atoms of radium-226, how much would remain after 3,200 years? The half-life of radium-226 is 1600 years.