

LIZARDI BHI	2008-09	Topics:	MARKS:
Chemistry	2nd term	Acid-base	
2009-02-18		Redox	

Exercise #1

A flask contains 100 mL 0.025 M ammonia in aqueous solution. Determine:

- the dissociation percent
- the number of moles of hydroxide ions
- the pH of this solution
- the volume of 25 g/L HCl needed to neutralize the ammonia solution

Atomic weights: H=1; Cl=35.5

Dissociation constant (ammonia) = 1.8×10^{-5}

Exercise #2

The density of a 40% HNO₃ solution is 1.25 g/mL. Determine

- the molarity
- the pH of this solution
- the concentration of a NH₃ solution if 125 mL of this unknown solution are titrated with 28 mL of the previous HNO₃ solution.
- if pH will be 7, more than 7 or less than 7 at the equivalence point; give the reasons

Atomic weights: H=1; N=14; O=16

Exercise #3

Metallic magnesium can be made by the electrolysis of molten MgCl₂

- What mass of Mg is formed by passing a current of 6.20 A through molten MgCl₂ for 3.5 days?
- How many minutes are needed to get 10 g Mg from molten MgCl₂ using 4.5 A current?

Atomic weight: Mg=24

Exercise #4

In acidic HCl solution, potassium permanganate (KMnO₄) oxidizes hydrogen sulfide (H₂S) to sulphur element. At the same time, permanganate is converted into Mn(II) ions (manganese (II) chloride).

- adjust the equation (in molecular form)
- identify: the oxidant, the reductant, the oxidized, and the reduced species
- draw a battery that uses this reaction and determine the standard potential
- Specify which part is the cathode, which the anode and what half-reaction takes place in each half-cell.

Reduction potentials: $E^0(\text{MnO}_4^-/\text{Mn}^{2+}) = 1.51 \text{ V}$; $E^0(\text{S}/\text{S}^{2-}) = 0.14 \text{ V}$

Exercise #5

Describe the following points about the acid rain:

- What is natural acidic rain
- Which are the gases that increase the acid rain
- The effect of strong acid rain on lakes
- The ways to reduce the impact of acid rain by dealing with gas emissions