1. Concentration =

Moles of solute of initial volume = 10 × 10-3L × 0.5.mol.L-1

= 0.005mol

Concentration =

= 0.02mol

2. The titrant is a solution of known concentration that is added (titrated) to another solution to determine the concentration of a second chemical species.

The titrand , is the species of interest during a titration. When a known concentration and volume of titrant is reacted with the analyte, it's possible to determine the analyte concentration.

3. 1. The beaker , pipette and the flask should be washed properly with distilled water.

2.Pipetting has to be accurate in order to avoid excess addition of the titrating agent.

3.The flask containing the indicator (phenolphthalein or methyl orange) must be shaken well while acid is added to it.

4.The acid should be added dropwise.

5.Contamination should be avoided.

4. Enthalpy is the amount of heat energy transferred (heat absorbed or emitted) in a chemical process under constant pressure.

Entropy measures the amount of heat dispersed or transferred during a chemical process.

Gibbs Energy is also known as energy available to initiate a chemical process under constant pressure and temperature.

5. ∆G = ∆H — T•∆S where,

∆G = Gibbs Free Energy

∆H = Change in Enthalpy

T = Temperature in K

∆S = Change in Entropy

6. The limiting reactant or limiting reagent is a reactant in a chemical reaction that determines the amount of product that is formed.

7. 2NH4Cl (s) + Ba(OH)2.8H2O (s) → 2NH3 (g) + BaCl2 (aq) + 10H2O (l)

Converting the reactants to moles

1 mole 2NH4Cl =

= 2.804mol

1 mole of Ba(OH)2.8H2O (s) =

= 0.919mole

Bariumhydroxide octahydrate is the limiting reagent

Using the coefficient of the balanced equations with the limiting reagent mole to moles of the products

2NH4Cl (s) + Ba(OH)2.8H2O (s) → 2NH3 (g) + BaCl2 (aq) + 10H2O (l)

2(0.919) 0.919 2(0.919) 0.919 10(0.919)

Moles of water formed

= 10 × 0.919

= 9.19mol

Theoretical yield of water

Yield(g) = mols ×

= 9.19 × 18

= 165.5g

% yield of water = × 100

= × 100

= 95%

Mole of Ba(OH)2 = = 0.100mol

Equivalent mass of Ba(OH)2 anhydrous

= 0.100 × 171.34

= 17.13g

8. A coordination compound consists of a central atom or ion , which is usually metallic and is called a coordination centre, and a surrounding array of bound molecules or ions, that are in turn known as ligands or complexing agents

Ligands are ions or molecules that binds to a central metal atom to form a coordination complex.

9. A chelating agent is a substance whose molecules can form several bonds to a single metal ion. In other words, a chelating agent is a multidentate ligand. An example of a chelating agent is ethylenediamine.

10. [Ag(NH3)2]+ = 2

[Cu(Cn)3)2- = 3

[NI(Co)4] = 4

[NiCi4]2- = 4

[CuCl4]2- = 4