Iodine, 0.005 mol/L

1000 mL of this solution contains 1.2690 g of iodine (I: 126.90).

Preparation—Before use, dilute 0.05 mol/L iodine VS with water to make exactly 10 times the initial volume.

Iodine, 0.002 mol/L

1000 mL of this solution contains 0.5076 g of iodine (I: 126.90).

Preparation—Before use, dilute 0.05 mol/L iodine VS with water to make exactly 25 times the initial volume.

Magnesium Chloride, 0.05 mol/L

1000 mL of this solution contains 10.165 g of magnesium chloride hexahydrate ($MgCl_2.6H_2O$: 203.30).

Preparation—Dissolve 10.2 g of magnesium chloride hexahydrate in freshly boiled and cooled water to make 1000 mL, and standardize the solution as follows:

Standardization—Measure exactly 25 mL of the prepared magnesium chloride solution. Add 50 mL of water, 3 mL of pH 10.7 ammonia-ammonium chloride buffer solution and 0.04 g of eriochrome black T-sodium chloride reagent, and titrate with 0.05 mol/L disodium dihydrogen ethylenediamine tetraacetate VS until the red-purple color of the solution changes to blue-purple. Calculate the molarity factor.

Magnesium Chloride, 0.01 mol/L

1000 mL of this solution contains 2.0330 g of magnesium chloride hexahydrate ($MgCl_2.6H_2O$: 203.30).

Preparation—Before use, dilute 0.05 mol/L magnesium chloride VS with water to make exactly 5 times the initial volume.

Oxalic Acid, 0.05 mol/L

1000 mL of this solution contains 6.303 g of oxalic acid ($C_2H_2O_4.2H_2O$: 126.07).

Preparation—Dissolve 6.3 g of oxalic acid in water to make 1000 mL, and standardize the solution as follows:

Standardization—Measure exactly 25 mL of the prepared oxalic acid solution in a 500-mL conical flask, and add 200 mL of diluted sulfuric acid (1 in 20), previously boiled for 10 to 15 minutes and then cooled to 27 ± 3°C. Transfer freshly standardized 0.02 mol/L potassium permanganate VS to a burette. Add quickly 22 mL of the 0.02 mol/L potassium permanganate VS to the oxalic acid solution from the burette under gentle stirring, and allow to stand until the red color of the mixture disappears. Heat the solution between 55°C and 60°C, and complete the titration by adding 0.02 mol/L potassium permanganate VS until a faint red color persists for 30 seconds. Add the last 0.5 to 1 mL dropwise, being particularly careful to allow the solution to become decolorized before the next drop is added. Calculate the molarity factor.

Note: Store protected from light.

Oxalic Acid, 0.005 mol/L

1000 mL of this solution contains 0.6303 g of oxalic acid ($C_2H_2O_4.2H_2O$: 126.07).

Preparation—Before use, dilute 0.05 mol/L oxalic acid VS with water to make exactly 10 times the initial volume.

Perchloric Acid, 0.1 mol/L

1000 mL of this solution contains 10.046 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Add slowly, keeping the temperature at about 20°C, 8.7 mL of perchloric acid to 1000 mL of acetic acid (100). Allow the mixture to stand for about 1 hour. Perform quickly the test as directed under the Water Determination with 3.0 mL of the mixture, and designate the water content as A (g/dL). To the rest mixture add slowly [(A − 0.03) × 52.2] mL of acetic anhydride with shaking at about 20°C. Allow the solution to stand for 24 hours, and standardize it as follows:

Standardization—Weigh accurately about 0.3 g of potassium hydrogen phthalate (standard reagent), previously dried at 105°C for 4 hours and allowed to cool in a desiccator (silica gel). Dissolve it in 50 mL of acetic acid (100), and titrate the solution with the prepared perchloric acid solution (Indicator method: 3 drops of crystal violet TS; or potentiometric titration). In the indicator method, titrate until the solution acquires a blue color. Perform a blank determination. Calculate the molarity factor.

Each mL of 0.1 mol/L perchloric acid VS
= 20.422 mg of $KHC_6H_4(COO)_2$

Note: Store protected from moisture.

Perchloric Acid, 0.05 mol/L

1000 mL of this solution contains 5.023 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Before use, dilute 0.1 mol/L perchloric acid VS with acetic acid for nonaqueous titration to make exactly twice the initial volume. Perform quickly the test as directed under the Water Determination with 8.0 mL of acetic acid for nonaqueous titration, and designate the water content as A (g/dL). If A is not less than 0.03, add [(A − 0.03) × 52.2] mL of acetic anhydride to 1000 mL of acetic acid for nonaqueous titration, and use it for the preparation.

Perchloric Acid, 0.02 mol/L

1000 mL of this solution contains 2.0092 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Before use, dilute 0.1 mol/L perchloric acid VS with acetic acid for nonaqueous titration to make exactly 5 times the initial volume. Perform quickly the test as directed under the Water Determination with 8.0 mL of acetic acid for nonaqueous titration, and designate the water content as A (g/dL). If A is not less than 0.03, add [(A − 0.03) × 52.2] mL of acetic anhydride to 1000 mL of acetic acid for nonaqueous titration, and use it for the preparation.

Perchloric Acid-1,4-Dioxane, 0.1 mol/L

1000 mL of this solution contains 10.046 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Dilute 8.5 mL of perchloric acid with 1,4-dioxane to make 1000 mL, and standardize the solution as follows:

Standardization—Weigh accurately about 0.5 g of potassium biphthalate (standard reagent), previously dried at 105°C for 4 hours and allowed to cool in a desiccator (silica gel). Dissolve it in 80 mL of acetic acid for nonaqueous titration, and add 3 drops of crystal violet TS. Titrate the solution with the prepared perchloric acid-1,4-dioxane solution until it acquires a blue color. Perform a blank determina-

tion. Calculate the molarity factor.

Each mL of 0.1 mol/L perchloric acid-1,4-dioxane VS
= 20.422 mg of $KHC_6H_4(COO)_2$

Note: Store in a cold place, protected from moisture.

Perchloric Acid-1,4-Dioxane, 0.05 mol/L

1000 mL of this solution contains 5.023 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Before use, dilute 0.1 mol/L perchloric acid-1,4-dioxane VS with 1,4-dioxane to make exactly twice the initial volume.

Perchloric Acid-1,4-Dioxane, 0.004 mol/L

1000 mL of this solution contains 0.4018 g of perchloric acid ($HClO_4$: 100.46).

Preparation—Before use, dilute 0.1 mol/L perchloric acid-1,4-dioxane VS with 1,4-dioxane to make exactly 25 times the initial volume.

Potassium Bichromate, 1/60 mol/L

1000 mL of this solution contains 4.903 g of potassium bichromate ($K_2Cr_2O_7$: 294.18).

Preparation—Weigh accurately about 4.903 g of potassium bichromate (standard reagent), previously powdered, dried between 100°C and 110°C for 3 to 4 hours and allowed to cool in a desiccator (silica gel), dissolve it in water to make exactly 1000 mL, and calculate the molarity factor.

Potassium Bromate, 1/60 mol/L

1000 mL of this solution contains 2.7833 g of potassium bromate ($KBrO_3$: 167.00).

Preparation—Dissolve 2.8 g of potassium bromate in water to make 1000 mL, and standardize the solution as follows:

Standardization—Measure exactly 25 mL of the prepared potassium bromate solution into an iodine flask. Add 2 g of potassium iodide and 5 mL of dilute sulfuric acid, stopper the flask, and allow the solution to stand for 5 minutes. Add 100 mL of water, and titrate the liberated iodine with 0.1 mol/L sodium thiosulfate VS. When the solution assumes a pale yellow color as the end point is approached, add 3 mL of starch TS. Continue the titration until the blue color disappears. Perform a blank determination. Calculate the molarity factor.

Potassium Ferricyanide, 0.1 mol/L

See Potassium Hexacyanoferrate (III), 0.1 mol/L

Potassium Ferricyanide, 0.05 mol/L

See Potassium Hexacyanoferrate (III), 0.05 mol/L.

Potassium Hexacyanoferrate (III), 0.1 mol/L

1000 mL of this solution contains 32.925 g of potassium hexacyanoferrate (III) [$K_3Fe(CN)_6$: 329.25].

Preparation—Dissolve 33 g of potassium hexacyanoferrate (III) in water to make 1000 mL, and standardize the solution as follows:

Standardization—Measure exactly 25 mL of the prepared potassium hexacyanoferrate (III) solution into an iodine flask. Add 2 g of potassium iodide and 10 mL of dilute hydrochloric acid, stopper the flask, and allow to stand for 15 minutes. Add 15 mL of zinc sulfate TS, and titrate the liberated iodine with 0.1 mol/L sodium thiosulfate VS. When the solution assumes a pale yellow color as the end point is approached, add 3 mL of starch TS. Continue the titration, until the blue color disappears. Perform a blank determination. Calculate the molarity factor.

Note: Store protected from Light. This solution, if stored for a long period, should be restandardized.

Potassium Hexacyanoferrate (III), 0.05 mol/L

1000 mL of this solution contains 16.462 g of potassium hexacyanoferrate (III) [$K_3Fe(CN)_6$: 329.25].

Preparation—Before use, dilute 0.1 mol/L potassium hexacyanoferrate (III) VS with water to make exactly twice the initial volume.

Potassium Hydroxide, 1 mol/L

1000 mL of this solution contains 56.11 g of potassium hydroxide (KOH: 56.11).

Preparation—Dissolve 65 g of potassium hydroxide in 950 mL of water. Add a freshly prepared, saturated solution of barium hydroxide octahydrate until no more precipitate is produced. Shake the mixture thoroughly, and allow it to stand for 24 hours in a tightly stoppered bottle. Decant the supernatant liquid or filter the solution through a glass filter (G3 or G4), and standardize the solution as follows:

Standardization—Weigh accurately about 2.5 g of amidosulfuric acid (standard reagent), previously dried in a desiccator (in vacuum, silica gel) for about 48 hours. Dissolve it in 25 mL of freshly boiled and cooled water, and add 2 drops of bromothymol blue TS. Titrate the solution with the prepared potassium hydroxide solution until it acquires a green color. Calculate the molarity factor.

Each mL of 1 mol/L potassium hydroxide VS
= 97.09 mg of $HOSO_2NH_2$

Note: Store in tightly stoppered bottles or in containers provided with a carbon dioxide-absorbing tube (soda-lime). This solution, if stored for a long period, should be restandardized.

Potassium Hydroxide, 0.5 mol/L

1000 mL of this solution contains 28.053 g of potassium hydroxide (KOH: 56.11).

Preparation—Weigh 32 g of potassium hydroxide, proceed as directed for preparation under 1 mol/L potassium hydroxide VS, and standardize the solution as follows:

Standardization—Proceed as directed for standardization under 1 mol/L potassium hydroxide VS, but weigh accurately about 1.3 g of amidosulfuric acid (standard reagent).

Each mL of 0.5 mol/L potassium hydroxide VS
= 48.55 mg of $HOSO_2NH_2$

Note: Store as directed under 1 mol/L potassium hydroxide VS. This solution, if stored for a long period, should be restandardized.

Potassium Hydroxide, 0.1 mol/L

1000 mL of this solution contains 5.611 g of potassium hydroxide (KOH: 56.11).

Preparation—Weigh 6.5 g of potassium hydroxide, proceed as directed for preparation under 1 mol/L potassium hydroxide VS, and standardize the solution as follows:

Standardization—Proceed as directed for standardization

under 1 mol/L potassium hydroxide VS, but weigh accurately about 0.25 g of amidosulfuric acid (standard reagent).

Each mL of 0.1 mol/L potassium hydroxide VS
= 9.709 mg of $HOSO_2NH_2$

Note: Store as directed under 1 mol/L potassium hydroxide VS. This solution, if stored for a long period, should be restandardized.

Potassium Hydroxide-Ethanol, 0.5 mol/L

1000 mL of this solution contains 28.053 g of potassium hydroxide (KOH: 56.11).

Preparation—Dissolve 35 g of potassium hydroxide in 20 mL of water, and add aldehyde-free ethanol to make 1000 mL. Allow the solution to stand for 24 hours in a tightly stoppered bottle. Then quickly decant the supernatant liquid, and standardize the solution as follows:

Standardization—Measure exactly 15 mL of 0.25 mol/L sulfuric acid VS, add 50 mL of water, and titrate with the prepared potassium hydroxide-ethanol solution to calculate the molarity factor (Indicator method: 2 drops of phenolphthalein TS; or potentiometric titration). In the indicator method, titrate until the solution acquires a pale red color.

Note: Store in tightly stoppered bottles, protected from light. Standardize before use.

Potassium Hydroxide-Ethanol, 0.1 mol/L

1000 mL of this solution contains 5.611 g of potassium hydroxide (KOH: 56.11).

Preparation—Weigh 7 g of potassium hydroxide, proceed as directed for preparation under 0.5 mol/L potassium hydroxide-ethanol VS, and standardize the solution as follows:

Standardization—Proceed as directed for standardization under 0.5 mol/L potassium hydroxide-ethanol VS, but measure exactly 15 mL of 0.05 mol/L sulfuric acid VS.

Note: Store as directed under 0.5 mol/L potassium hydroxide-ethanol VS. Standardize before use.

Potassium Iodate, 0.05 mol/L

1000 mL of this solution contains 10.700 g of potassium iodate (KIO_3: 214.00).

Preparation—Weigh accurately about 10.700 g of potassium iodate (standard reagent), previously dried between 120°C and 140°C for 1.5 to 2 hours and allowed to cool in a desiccator (silica gel), and dissolve it in water to make exactly 1000 mL. Calculate the molarity factor.

Potassium Iodate, 1/60 mol/L

1000 mL of this solution contains 3.567 g of potassium iodate (KIO_3: 214.00).

Preparation—Weigh accurately about 3.567 g of potassium iodate (standard reagent), previously dried between 120°C and 140°C for 2 hours and allowed to cool in a desiccator (silica gel), and dissolve it in water to make exactly 1000 mL. Calculate the molarity factor.

Potassium Iodate, 1/1200 mol/L

1000 mL of this solution contains 0.17833 g of potassium iodate (KIO_3: 214.00).

Preparation—Weigh accurately about 0.17833 g of potassium iodate, previously dried between 120°C and 140°C for 1.5 to 2 hours and allowed to cool in a desiccator (silica gel), and dissolve it in water to make exactly 1000 mL. Calculate the molarity factor.

Potassium Permanganate, 0.02 mol/L

1000 mL of this solution contains 3.1607 g of potassium permanganate ($KMnO_4$: 158.03).

Preparation—Dissolve 3.2 g of potassium permanganate in water to make 1000 mL, and boil the solution for 15 minutes. Allow the solution to stand for at least 48 hours in a tightly stoppered flask, and filter it through a glass filter (G3 or G4). Standardize the solution as follows:

Standardization—Weigh accurately about 0.3 g of sodium oxalate (standard reagent), previously dried between 150°C and 200°C for 1 to 1.5 hours and allowed to cool in a desiccator (silica gel), transfer it to a 500 mL conical flask, dissolve in 30 mL of water, add 250 mL of diluted sulfuric acid (1 in 20), and warm the mixture betuween 30°C and 35°C. Transfer the prepared potassium permanganate solution to a buret, add quickly 40 mL of the solution under gentle stirring from the buret, and allow to stand until the red color of the mixture disappears. Warm the solution between 55°C and 60°C, and complete the titration by adding the potassium permanganate solution until a faint red color persists for 30 seconds. Add the last 0.5 to 1 mL dropwise before the end point, being particularly careful to allow the solution to be decolorized before the next drop is added. Calculate the molarity factor.

Each mL of 0.02 mol/L potassium permanganate VS
= 6.700 mg of $Na_2C_2O_4$

Note: Store protected from light. This solution, if stored for a long period, should be restandardized.

Potassium Permanganate, 0.002 mol/L

1000 mL of this solution contains 0.31607 g of potassium permanganate ($KMnO_4$: 158.03).

Preparation—Before use, dilute 0.02 mol/L potassium permanganate VS with water to make exactly 10 times the initial volume.

Silver Nitrate, 0.1 mol/L

1000 mL of this solution contains 16.987 g of silver nitrate ($AgNO_3$: 169.87).

Preparation—Dissolve 17.0 g of silver nitrate in water to make 1000 mL, and standardize the solution as follows:

Standardization—Weigh accurately about 0.08 g of sodium chloride (standard reagent), previously dried between 500°C and 650°C for 40 to 50 minutes and allowed to cool in a desiccator (silica gel), dissolve it in 50 mL of water, and titrate under vigorous stirring with the prepared silver nitrate solution to calculate the molarity factor (Indicator method: 3 drops of fluorescein TS; or potentiometric titration: silver electrode). In the indicator method, titrate until the color of the solution changes from yellow-green to yellow-orange through yellow.

Each mL of 0.1 mol/L silver nitrate VS
= 5.844 mg of NaCl

Note: Store protected from light.

Silver Nitrate, 0.02 mol/L

1000 mL of this solution contains 3.3974 g of silver

nitrate ($AgNO_3$: 169.87).

Preparation—Before use, dilute 0.1 mol/L silver nitrate VS with water to make exactly 5 times the initial volume.

Silver Nitrate, 0.01 mol/L

1000 mL of this solution contains 1.6987 g of silver nitrate ($AgNO_3$: 169.87).

Preparation—Before use, dilute 0.1 mol/L silver nitrate VS with water to make exactly 10 times the initial volume.

Silver Nitrate, 0.005 mol/L

1000 mL of this solution contains 0.8494 g of silver nitrate ($AgNO_3$: 169.87).

Preparation—Before use, dilute 0.1 mol/L silver nitrate VS with water to make exactly 20 times the initial volume.

Silver Nitrate, 0.001 mol/L

1000 mL of this solution contains 0.16987 g of silver nitrate ($AgNO_3$: 169.87).

Preparation—Dilute 0.1 mol/L silver nitrate VS with water to make exactly 100 times of the initial volume before use.

Sodium Acetate, 0.1 mol/L

1000 mL of this solution contains 8.203 g of sodium acetate (CH_3COONa: 82.03).

Preparation—Dissolve 8.20 g of anhydrous sodium acetate in acetic acid (100) to make 1000 mL, and standardize the solution as follows:

Standardization—Pipet 25 mL of the prepared sodium acetate solution, add 50 mL of acetic acid (100) and 1 mL of *p*-naphtholbenzeine TS, and titrate with 0.1 mol/L perchloric acid VS until a yellow-brown color changes through yellow to green. Perform a blank determination. Calculate the molarity factor.

Sodium Hydroxide, 1 mol/L

1000 mL of this solution contains 39.997 g of sodium hydroxide (NaOH: 39.997).

Preparation—Dissolve 42 g of sodium hydroxide in 950 mL of water. Add a freshly prepared, saturated solution of barium hydroxide until no more precipitate is produced. Mix well the mixture, and allow to stand for 24 hours in a tightly stoppered bottle. Decant the supernatant liquid or filter the solution through a glass filter (G3 or G4), and standardize the solution as follows:

Standardization—Weigh accurately about 1.5 g of amidosulfuric acid (standard reagent), previously dried in a desiccator (in vacuum, silica gel) for about 48 hours. Dissolve it in 25 mL of freshly boiled and cooled water, and titrate the solution with the prepared sodium hydroxide solution to calculate the molarity factor (Indicator method: 2 drops of bromothymol blue TS; or potentiometric titration). In the indicator method, titrate until the solution acquires a green color.

Each mL of 1 mol/L sodium hydroxide VS
= 97.09 mg of $HOSO_2NH_2$

Note: Store in tightly stoppered bottles or in containers provided with a carbon dioxide-absorbing tube (soda lime). This solution, if stored for a long period, should be restandardized.

Sodium Hydroxide, 0.5 mol/L

1000 mL of this solution contains 19.999 g of sodium hydroxide (NaOH: 39.997).

Preparation—Weigh 22 g of sodium hydroxide, proceed as directed for preparation under 1 mol/L sodium hydroxide VS, and standardize the solution as follows:

Standardization—Proceed as directed for standardization under 1 mol/L sodium hydroxide VS, but weigh accurately about 0.7 g of amidosulfuric acid (standard reagent).

Each mL of 0.5 mol/L sodium hydroxide VS
= 48.55 mg of $HOSO_2NH_2$

Note: Store as directed under 1 mol/L sodium hydroxide VS. This solution, if stored for a long period, should be restandardized.

Sodium Hydroxide, 0.2 mol/L

1000 mL of this solution contains 7.999 g of sodium hydroxide (NaOH: 39.997).

Preparation—Weigh 9 g of sodium hydroxide, proceed as directed for preparation under 1 mol/L sodium hydroxide VS, and standardize the solution as follows:

Standardization—Proceed as directed for standardization under 1 mol/L sodium hydroxide VS, but weigh accurately about 0.3 g of amidosulfuric acid (standard reagent).

Each mL of 0.2 mol/L sodium hydroxide VS
= 19.419 mg of $HOSO_2NH_2$

Note: Store as directed under 1 mol/L sodium hydroxide VS. This solution, if stored for a long period, should be restandardized.

Sodium Hydroxide, 0.1 mol/L

1000 mL of this solution contains 3.9997 g of sodium hydroxide (NaOH: 39.997).

Preparation—Weigh 4.5 g of sodium hydroxide, proceed as directed for preparation under 1 mol/L sodium hydroxide VS, and standardize the solution as follows.

Standardization—Proceed as directed for standardization under 1 mol/L sodium hydroxide VS, but weigh accurately about 0.15 g of amidosulfuric acid (standard reagent).

Each mL of 0.1 mol/L sodium hydroxide VS
= 9.709 mg of $HOSO_2NH_2$

Note: Store as directed under 1 mol/L sodium hydroxide VS. This solution, if stored for a long period, should be restandardized.

Sodium Hydroxide, 0.05 mol/L

1000 mL of this solution contains 1.9999 g of sodium hydroxide (NaOH: 39.997).

Preparation—Before use, dilute 0.1 mol/L sodium hydroxide VS with freshly boiled and cooled water to make exactly twice the initial volume.

Sodium Hydroxide, 0.02 mol/L

1000 mL of this solution contains 0.7999 g of sodium hydroxide (NaOH: 39.997).

Preparation—Before use, dilute 0.1 mol/L sodium hydroxide VS with freshly boiled and cooled water to make exactly 5 times the initial volume.