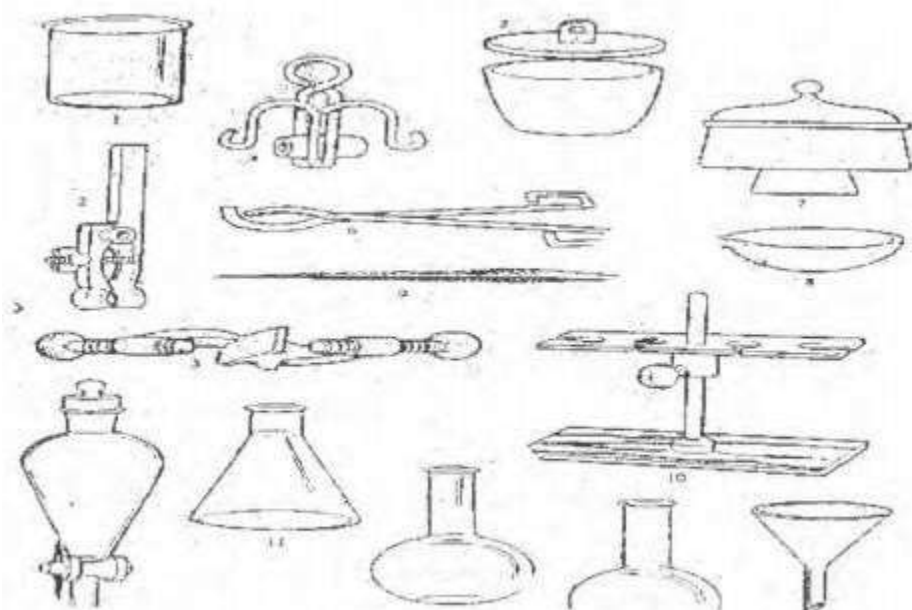
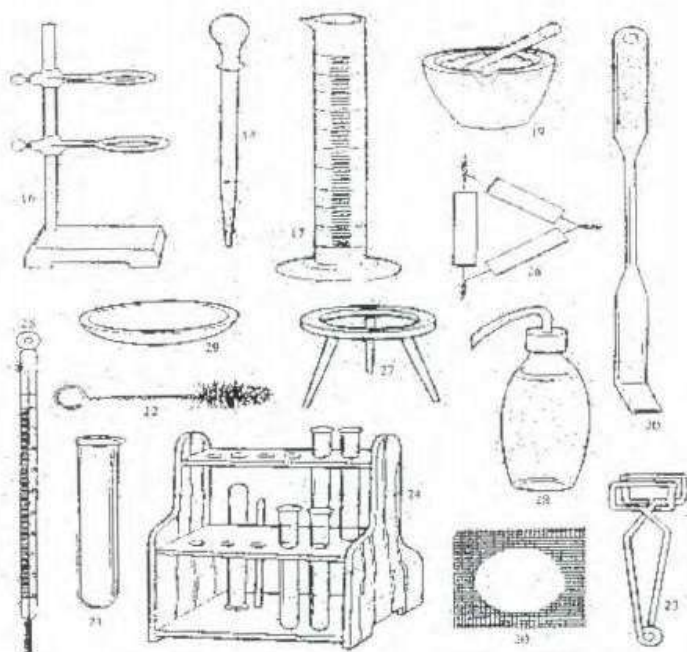




calculus educational consults

MOTTO: BRINGING KNOWLEDGE TO YOUR DOORSTEP

CHM191: INTRODUCTORY PRACTICAL CHEMISTRY I



- | | |
|--------------------------------------|----------------------------|
| 1. Beaker | 19. Mortar and pestle |
| 2. Clamp | 20. Spatula |
| 3. Clamp holder | 21. Test - tube |
| 4. Clip (Mohr's clip or rubber clip) | 22. Test - tube brush |
| 5. Crucible and crucible cover | 23. Test - tube holder |
| 6. Crucible tongs | 24. Test - tube rack |
| 7. Desiccator | 25. Thermometer |
| 8. Evaporating dish | 26. Triangle |
| 9. File, triangular | 27. Tripod or tripod stand |
| 10. Filter stand or rack | 28. Wash bottle (plastic) |
| 11. Flask, conical | 29. Watch glass |
| 12. Flask, flat bottom | 30. Wire gauze |
| 13. Flask, round bottom | |
| 14. Funnel (filter) | |
| 15. Funnel (Separatory) | |
| 16. Iron stand and rings | |
| 17. Measuring cylinder | |
| 18. Medicine dropper | |

___ is used to attain moderately high temperature of up to 600°C .

Bunsen burner

Boiling water bath are used for heating solutions up to 100°C

Precipitation is a process in which ions present in solution are converted into an insoluble compound called **precipitate**

Filtration is the process of separation of a solid (crystals or precipitate) from the liquid (mother liquor).

A **desiccator** is an airtight container that contains a drying agent or desiccant such as anhydrous calcium chloride, silica etc.

___ are tools and techniques commonly encountered during volumetric analyses.

volumetric Tools and Techniques

Volumetric flasks are flat bottom flasks with long necks designed to contain definite stated volumes of liquid

Pipettes are used for transferring liquids or solutions from one container to another container

A **burette** is a long glass tube fitted with a tap or stopcock through which the liquid contained in it is delivered via a small opening at one end

___ is designed to measure accurately the volume of liquid delivered during a titration.

Burette

The **conical flask** is used in volumetric analysis as a container in which the reactants meet and the product is formed.

The apparatus used for weighing is called a **balance**.

The **term concentration of a substance** refers to the amount or quantity of the substance either wholly in relation to another substance

___ is the amount of substance, which contains as many elementary units as there are atoms in 12.0g of carbon — 1
mole

The **molarity of a solution** is defined as the number of moles of solute in one cubic decimeter (dm^3) or one litre (L) of solution.

The **molality of a solution** is defined as the number of moles of solute in one kilogram (kg) of solution.

Normality is the number of gram — equivalent weight of solute in 1 dm^3 of solution

___ is defined as the ratio of the weight of solute to the total weight of solute plus solvent multiplied by 100
Percentage of weight

___ is defined as the ratio of the volume of solute to the total volume of solute plus solvent multiplied by 100.
Percentage by volume

___ is defined as the number of grams of solute in one hundred (100 cm^3) of solution multiplied by 100.
Percentage weight by volume

When standard solution does not react with the substance being determined, but instead with another substance that is produced in the sample in equivalent amount of the determined substance is referred to as ___
Indirect titration

The **choice of an indicator** in an acid — base titration depends on the strengths (strong or weak) of the acid and base.

A process that is accompanied by a heat gain is said to be **ENDOTHERMIC**

In redox titration involving potassium permanganate, if the contents of the conical flask turn brown, it means ___ was added
Insufficient acid catalyst

Potassium permanganate is a self-indicating reagent because of its different characteristic ___ in either the acidic or basic medium
Colour change

Potassium permanganate can be used to estimate the ___ of a substance
Percentage purity

$\text{IO}_3^- + \text{SO}_3^{2-} + \text{H}^+ \rightarrow \text{I}^- + \text{SO}_4^{2-} + \text{H}_2\text{O}$ The oxidation state of oxygen in the product's equation is ___

+6

$\text{IO}_3^- + \text{SO}_3^{2-} + \text{H}^+ \rightarrow \text{I}^- + \text{SO}_4^{2-} + \text{H}_2\text{O}$ the oxidation state of oxygen in the equation is _____

+4

A substance which loses water of hydration upon exposure to atmosphere is called?

Efflorescence substance

Volumetric analysis involving iodine are usually referred to as _____

iodometry

In the _____, standard solutions of iodine are used to estimate directly the concentrations of some oxidizable species.

Direct method

Of all the oxidizable species available for use, iodine titration are usually used with the _____

Thiopsulphate

The colour changes accompanying the varying change in oxidation states of iodine and its ion can be used to indicate the _____

End point

The most commonly used external indicator for iodine titration is _____

Starch solution

The starch solution forms a _____ complex with the tri-iodide ion during the titration that is rapidly discharge at the end point

Blue black

Thus using starch as indicator, the colour variations of the solution depend on _____ formation of the starch with iodide ion formed in the last stage of the titration.

Complex

For this reason and in order to avoid complications in the end point detection, the starch indicator is added at the _____ colouration of the solution which is near the end point

Light yellow

Complete the colour change in iodometry analysis. _____ (initially)?

Red-brown

Light yellow colouration is observed at near end point of the iodometry analysis. True or false _____

True

During iodometry analysis the blue black colouration appear at the end of the titration. True or false _____

False

The oxidation potentials of Na is _____

2.71

The study of thermal changes in chemical and physical processes is known as_____

Thermodynamics

The_____is the amount of heat released or observed for a given amount of reactants or products

Heat of reaction

Predict the colour of methyl orange when pH is 8?

Yellow

At complete neutralization point, the litmus paper colour turns?

Purple

At neutralization point the pH value is?

Seven

What is a pH of a solution?

It is the measure of hydrogen ions concentration in the solution

In an acid base titration conducted by a student the colour of the solution in the beaker changed from colourless to pink when phenolphthalein was used as an indicator, what went wrong?

The beaker was occupied by acid solution instead of base.

Which of the following options is an indicator use for acid-base titration?

Methyl orange

The point at which stoichiometrically equivalent quantities of substance have been brought together is known as?

Equivalence point of titration

The concentration of pure HCl 11.7 Molar if 20 cm^3 of the acid is diluted to 250 cm^3 to give concentration of 0.936 mol.dm^3 substitute this values on this equation; $C_1V_1=C_2V_2$?

$11.7 \times 20 = 0.936 \times 250$

Give reason why water should not be added to acid during carrying out acid-base titration?

The dissolution of acid in water is exothermic which may cause explosion

A table of requirement for laboratory experiment contains the following except?

Quantity of apparatus

List of apparatus

List of chemicals

List of weight of each reagents

A substance which takes in only moisture upon exposure to atmosphere is refer to as?

Deliquescence substance

A substance which loses water of hydration upon exposure to atmosphere is called?

Efflorescence substance

If 2 cm³ of a stock solution contains 1 mole of an acid how would you prepare 1 molar concentration of that acid in 250 cm³ of water?

Dissolve 2 cm³ of the stock solution in 248 cm³ of water

In a chemistry laboratory a stock bottle of acid solution reads, 1.25 specific gravity; what does that mean?

1 cm³ of that solution weighs 1.25 g

A solution contains 1.2 Molar concentration, what volume of it must be diluted with water to give 600 ml of 0.5 Molar solution?

25 ml

In preparing a standard solution, two factors must be considered?

1. The solute must be pure and 2. a suitable solvent be measured to definite volume

Define standard solution?

A solution of which the concentration is accurately known

What is the w/v percentage concentration of 300 ml of NaCl(aq) containing 5 g NaCl?

1.66 % w/v

Calculate the mass of NaCl in 450 g of NaCl solution containing NaCl w/w %?

157.5 g

What is the percentage w/w % ethanol if 5 g of ethanol is dissolved in 20 g of water?

20 % w/w

One of the disadvantages of acid-base titration is?

Requires careful attention to reach end point accurately

All are advantages of acid base titration except?

Simple to do

Less accuracy and precision

Cost effective

Do not need high expertise

The equation $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ is a _____?

Neutralization reaction

When performing acid-base titration, one should first?

Rinse the burette twice with acid solution

Which of these is a method of finding the equivalence point? PH indicator

Amperometry

Thermometric titrimetry

All of the above

What is a titrant in titration analysis?

Known concentration and volume of an analyte

What is a titrand in titration analysis?

Unknown concentration of an analyte

During acid-base titration sulphuric acid would be dissociated into what ions?

$2\text{H}^{+} + \text{SO}_4^{2-}$

Both molarity and normality are measures of concentration. True or false?

True

Choose the most suitable water for use in acid base titration?

Deionised water

A student used a hard tap water and performed an acid base titration. In few lines explain what would happen to his result?

The starting solution would be more alkaline therefore it would require more volume of acid than expected

A 25 ml solution of 0.5 M NaOH is titrated until neutralized into a 50 ml sample of HCl?

0.25 mol

What is the importance of back titration?

To determine the concentration of a substance that is in excess after a chemical reaction.

What is the implication of adding a phenolphthalein as an indicator during the titration of HCl against Na_2CO_3 ?

The end point will appear when only half of Na_2CO_3 has been used

Which of these indicators will be suitable for use in titration involving a weak acid and a strong base?

Phenolphthalein

What type of indicator will be suitable for use in a titration involving $\text{H}_2\text{SO}_4 + \text{NH}_3(\text{aq})$?

Methyl orange

An example of a strong acid is?

H_2SO_4

What is a strong acid?

Any acid that ionizes completely in solution

An indicator X was added to an acid solution in a beaker but no colour change was observed give the name of the indicator X?

Phenolphthalein

What is the colour of bromothymol when added to an acid solution?

Yellow

The unit μg is equivalent to?

10^{-9} Kg

When filtration is carried out under reduced pressure is called?

Suction filtration

The unit of a volume express in dm^3 is equivalent to?

10^3 cm or 1 litre

Define precipitation in respect to wet chemical analysis?

A method of converting ions in solution into an insoluble compound

What is a mole?

The amount of substance which contains as many element as there are atoms in 12 g carbon 12

Why do we heat precipitates during gravimetric analysis?

To dry the precipitates

The Avogadro number 6.02×10^{23} is equivalent to?

Number of elementary units in a mole of a substance

Choose from the list of chemicals given and determine which has negative effect on skin?

Phenols and hydrogenfluoride

Calculate the molar mass of 1 mole of a pure substance weighting X g?

$M = X \text{ g mol}^{-1}$

Which of these hazardous chemicals are likely to cause dizziness and are carcinogenic?

Benzene

Calculate the mass of 0.5 moles of water?

9.408 g

The hazardous effect of chlorinated alkanes is?

Causes mental confusion

Calculate the number of moles in 24 g of oxygen gas?

7.8 mol

All are laboratory safety tips except?

Wearing lab coat or apron

Close all windows and doors

Never work alone in the laboratory
Be familiar with the position of some safety equipment

Calculate the molar mass of a pure substance if 2 moles of the substance has a mass of 35 g?
17.5 g mol⁻¹

Qualitative analysis helps in determining what in a given solution?
What type of component is present in that solution

Define molality of a solution?
The number of moles of solute in one kilogram of solution

Quantitative methods help in determining what in a solution?
How much of a component is present in the solution

Normality can be defined as?
Number of gram equivalent weight of a solute in one litre of solution

The various method of quantitative analysis include?
Gravimetric, spectrophotometric and volumetric methods

The various method of quantitative analysis include?
Gravimetric, spectrophotometric and volumetric methods

The study of thermal changes in chemical and physical processes is known as _____
Thermodynamics

In case of acid spill on the eye what will you apply after flushing your eye with large amount of water?
50 percent sodium bicarbonate

Define molality of a solution?
The number of moles of solute in one kilogram of solution

Why do we heat precipitates during gravimetric analysis?
To dry the precipitates

Complete the colour change in iodometry analysis. _____ (initially) to _____
Red-brown

For this reason and in order to avoid complications in the end point detection, the starch indicator is added at the _____ colouration of the solution which is near the end point
Light yellow

One of these is not a benefit of heating substance in the laboratory
Purification

The process of converting ions in solution to insoluble solute is referred to as _____
Precipitation

The most commonly used external indicator for iodine titration is_____

Starch solution

An undergraduate weighed out 20grams of sodium hydroxide pellets. If Na =23,O = 16 andH = 1, What is the mole of this sodium hydroxide.

0.25mole

The base unit of a measured liquid called volume is_____.

Cubic meter

The base unit of a measured or weighed solid material in chemistry is_____.

Kilogram

The technique of separation employed to purify an organic solid that may be contaminated by impurities is called_____.

Recrystallization

The technique employed for the separation of colours is called:

Chromatography

The separation technique employed to separate mixtures of two or more liquids with slightly different boiling points is called_____.

Fractional distillation

The condensate collected during the vaporization of liquid is called:

Distillate

An apparatus that can be used to remove traces of water from a substance is_____.

Dessicator

The process by which traces of water is removed by treating the liquid with suitable drying agents is called_____.

Dehydration

The separation technique employed to purify an organic liquid or to separate mixtures of liquids of different volatilities or boiling points is called_____.

Distillation

A separation technique that is used to isolate a desired solid from a solid –liquid mixture or for freeing a desired liquid of solid impurities is called

Filtration

The reagent that will not make any significant contribution to the theoretical yield is_____.

Limiting reagent

A high percentage yield implies that_____.

successful reaction

The reagent with a stoichiometric amount (in moles) that limits the amount of desired product (in moles) formed is called:

Limiting reagent

The actual yield of product (in g or moles) expressed as a percentage of the theoretical yield (in g or moles) is called _____.

Percentage yield

The number of protons or electrons in the atom of an element is equal to the of the element.

Atomic number

Calculate the $[\text{OH}^-]$ of an aqueous solution of $\text{pH}=11$ $1 \times 10^{-3} \text{M}$ FBQ An acid HA has a pK_a of 4.5, what is the K_a value?

3.2×10^{-5}

An acid HA has a pK_a of 4.5. What is the concentration of H_3^+ in 0.110M solution of the acid ?

1.876×10^{-3}

Calculate the $[\text{H}^+]$ of an aqueous solution with $[\text{OH}^-]$ of $1 \times 10^{-10} \text{M}$. What is the pH of the solution? Is the solution acidic or basic?

4

When two or more elements combine chemically in fixed proportion by mass, _____ is formed

Compounds

A mixture in which the components are evenly distributed and the composition is uniform throughout the mixture is called _____ mixture.

Homogeneous

Dissolution of sodium chloride in water results in _____ type of mixture

Homogeneous

The types of mixtures are _____ mixture.

**Homogeneous,
Heterogeneous**

Convert 2 moles of NaOH to grams of NaOH. Answer is _____.

80g

The molar mass of Na_2CO_3 _____

106g

When propane reacts with oxygen, the products are _____ and _____

Carbon dioxide, water.

Convert 500g of Na_2CO_3 to moles

4.717mol

A compound in grams is converted to moles by dividing by _____.

Molar mass

The smallest unit of a compound that manifest all the chemical properties of the compound is called _____.

Molecule

A mixture in which the components are not evenly distributed and the composition is not uniform is called _____ mixture.

Heterogeneous

Mixtures with particle sizes between 2 to 1000 nanometre are called _____.

Colloids

The label on a stock bottle of acid reads : 56% by mass and 1.25 specific gravity. If the molar mass of the acid is 56, what is the concentration in grams per dm^3 _____

700g

Mixtures with particle sizes greater than 1000 nanometres are called _____.

Suspensions

Mixture made up of sand and iron filing is a type of _____ mixture

Heterogeneous

The formula for sodium carbonate is _____.

Na_2CO_3

The formula for caustic soda is _____.

NaOH

In balancing this equation $\text{Na}_2\text{CO}_3 \rightarrow ? \text{NaOH} + \text{CaCO}_3$. ? is _____.

2

In a solution , the component in smaller amount is called _____.

Solute

In a solution, the component in larger amount is called _____.

Solvent

A substance that is made up of two or more substances which are not chemically combined is called _____.

Mixture

Calculate the percentage by mass of Hydrogen in NH_3

0.1775

Calculate the percentage by mass of Nitrogen in NH_3

0.8225

0.0055 has _____ significant figure(s)

2

The amount of product obtained from an experiment is called_____.

Actual yield

The amount of product expected from given amounts of starting materials is called_____.

Theoretical yield

In a chemical reaction, the balanced chemical equation which shows the quantitative relationship between masses of reactants and products is known as_____.

Stoichiometry of the reaction

The amount of energy required to break a particular bond is called_____.

Bond dissociation energy

12.25mL has_____significant figure(s)

4

Calculate the percentage by mass of Oxygen in CH_3OH

0.4995

Calculate the percentage by mass of Hydrogen in CH_3OH

0.1259

Calculate the percentage by mass of carbon in CH_3OH

0.3746

An organic compound was found by analysis to contain 42.90% carbon, 2.40% Hydrogen , 16.70% Nitrogen and 38.0% of oxygen. Calculate its empirical formula. (Relative atomic masses : C=12.00, H=1.008, N=14.00, O=16.00). $\text{C}_3\text{H}_2\text{NO}_2$ is called_____.

Avogadro number

A chemical formula which shows the actual numbers and types of atoms present in one molecule of a compound is called_____.

Molecular formula

A chemical formula which represents the elemental composition of a formula unit of the compound in terms of smallest whole number ratios of the atoms present is called_____.

Empirical formula

The number of atoms in the atomic mass of every element is called_____.

Mole

The unit of mole is_____.

Mol

Calculate the formular mass of potassium carbonate.(Relative atomic masses : K=39.10amu, C=12.01amu, 16.00amu).

138.21amu

The empirical formula obtained for a compound is $C_3H_2NO_2$.The gram molecular mass of the compound is found to be 168g. Determine its molecular formular.(Relative atomic masses :C=12.00, H=1.008, N=14.00, O=16.00).

$C_6H_4N_2O_4$

A substance with a pH value of $>7 < 10$ is a -----.

Weak base

If actual yield of an ester is 32.7g and theoretical yield is 35.1g .What is the percentage yield of the ester?

0.932

The formular obtained by multiplying the number of each atom in the empirical formular by n is called --

Molecular formula

There are _____types of titrimetric analysis.

4

In titration, the experimentally determined stoichiometric point of the titration is referred to as-----
-----.

Equivalence point

In a standardization titration involving hydrochloric acid and sodium carbonate, a student recorded the following results for the volume of hydrochloric acid used against 10.00mL of the sodium carbonate solution : 15.60; 14.50;14.70 and 14.20. If the concentration of the Na_2CO_3 standard solution is 0.75 mol dm^{-3} , calculate the concentration of the HCl solution

1.03mL

The number of gramequivalent weight of solute in one cubic decimeter of solution is _____.

Normality

There are _____different techniques for determination of an unknown sample in titrimetric analysis.

3

The solution whose concentration is known is called _____.

Titrant

The concentration of the pure HCl used is 11.7 molar. If 20.0 cm^3 of 1.7 molar of HCl is diluted to 250 cm^3 of V_2 , then the new concentration C_2 will be _____.

0.936 moles

dm^{-3}

The procedure by which a solution of known concentration is added to another solution until the chemical reaction between the two solutes is complete is _____.

Titrimetric analysis

From the equation $2\text{HCl} + \text{Na}_2\text{CO}_3 \rightarrow 2\text{NaCl} + \text{CO}_2 + \text{H}_2\text{O}$, given that 2 moles of HCl reacted with 1 mole of Na_2CO_3 . What was the concentration of the acid?

1.03 mol dm^{-3}

The label on a stock bottle of an acid reads: 56% by mass and 1.25 specific gravity. If the molar mass of the acid is 56, find the volume of this acid that is required to prepare 250 cm³ of 1.0 molar concentration of the acid.

2.0 cm^3

3.47g sodium carbonate was dissolved in a 250 millilitre standard flask. What is the concentration of the resulting solution

0.13M

The label on a stock bottle of an acid reads: 56% by mass and 1.25 specific gravity. If the molar mass of the acid is 56, find the moles per dm³

12.5 mol dm^{-3}

The residue of a chemical reaction is allowed to cool in a _____.

Dessicator

In this equation $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + ? + \text{CO}_2$, the compound represented by ? is

H_2O

When a substance is not available in a pure form, its solution can be standardized by _____.

Titrating against a substance of known concentration

A standard solution is a _____.

Solution of known Concentration

A standard solution of a substance can be prepared if the substance can be obtained in _____ state.

pure state

What is the oxidation state of chromium in potassium dichromate?

+6

The label on a stock bottle of an acid reads: 56% by mass and 1.25 specific gravity. If the molar mass of the acid is 56, find the concentration in grams per dm³.

700 g/dm^3

A solution of which the concentration is accurately known is _____.

Standard solution

Weight of solute in gram per volume of solutions in cm^3 multiplied by 100 is _____.

Percentage weight by volume

Moles of solute per volume of solution in one cubic decimeter is _____.

Molarity

If 15 cm^3 of 10.25M HCl solution is made up to volume in a 500mL volumetric flask, what will be its new concentration?

3.06M

The pH scale range is _____.

0 to 14

The product represented by the ? in the equation $\text{CH}_3\text{COO}^- + \text{H}^+ + \text{Na}^+ + \text{OH}^- \rightarrow ? + \text{H}_2\text{O}$ is _____.

$\text{CH}_3\text{COO}^- \text{Na}^+$

The reactant represented by the ? In the equation $\text{H}_2\text{O} + ? \rightarrow 2\text{H}_2\text{O}$ is _____.

OH^-

In a typical experiment in a laboratory, 4.50g of sulphuric acid in 250 cm^3 of water was titrated with an impure solution of 5.24g of sodium hydroxide contained in 1 dm³. If the titre values of the experiment were 20.50, 22.45, 22.60 and 22.50 cm^3 respectively. Determine the amount in moles of the acid.

0.0013 mol

The oxidation state of chromium in $\text{Cr}_2\text{O}_7^{2-}$ is _____.

+6

The heat of reaction is measured by the use of _____.

Calorimeter

What is the oxidation state of iodine in iodate ion?

+7

If the mass of an impure acid is 18.0g and mass of impurity is 12.3g, calculate the percentage impurity of the solution.

0.6833

The titrimetric analysis involving the titration of EDTA, an organic ligand with a calcium solution could be classified as _____ titration.

Complexometric

The titration involving potassium permanganate, KMnO_4 and ferrous sulphate FeSO_4 is an example of a ----- titration.

Oxidation-reduction

All these are examples of exothermic reactions EXCEPT _____.

Addition of concentrated

acids to water

Neutralisation

reactions

Addition of ammonium

chloride to water

Addition of potassium

hydroxide pellets to water

A suitable indicator for titration between weak acid and strong base is _____.

Phenolphthalein

A substance that loses an electron is said to be _____.

Oxidized

The reaction between aqueous sodium hydroxide and aqueous hydrochloric acid is a _____ reaction

Neutralisation

The pH of a solution is a measure of -----concentration of the solution.

Hydrogen

If a reaction is carried out at a constant pressure, the absolute value of the heat of reaction is equal to the absolute value of the _____ of the reaction

Enthalpy

A process that is accompanied by a heat gain is said to be _____.

Endothermic

The titration of a strong acid against a weak base is suitably carried out using -----

Methyl orange

The oxidation state of C in $\text{H}_2\text{C}_2\text{O}_4$ is _____.

+4

Calculate the number of mole contained in a solution of tetraoxosulphate VI acid, if the titre value on titration against 20cm^3 0.5 M sodium carbonate is 20.24cm^3 .

0.01mol

The sum of the oxidation states of all elements in a neutral compound add to _____.

Zero

A metal X that reacts with metal Y in a solution of Y but does not react with Z in a solution of Z means that -----.

Metal Y is the least reactive

The SI designation candela is for-----base unit.

Luminous intensity

The pH of a solution is a measure of the-----.

Carbon concentration

The first aid given to a person that ingested poisonous chemical in the laboratory include all these EXCEPT -----.

Inducing vomiting

The second action to perform to resuscitate a victim of gas inhalation in the laboratory is to-----.

Loosen clothing

Towards the-----point, both coloured forms will be present in appreciable quantities.

End – point

A measure of the hydrogen ion concentration in a solution is-----.

Ph

An indicator that is colourless in acidic solution is-----.

Methyl red

When an alkalis chemical splashes into the eye, the second action to be carried out is -----.

Apply 1% boric acid solution

Acid base titration involves a-----reaction

Neutralization

When an acidic chemical splashes into the eyes, the first thing to do is -----

Flush the eye with a copious amount of clean lukewarm running water

Do not use flat-bottomed flasks in vacuum experiment is a----- hazard

Explosion

All these are safety precautions in a chemistry laboratory EXCEPT -----

Wear loose clothings when in the chemistry laboratory

Because of the intense colouration of-----it is very difficult to read the meniscus of the solution in burette.

KMnO₄

The potassium permanganate solution intended for _____ must be standardised prior to use.

Redox titration

A standard solution of Oxalic acid is a hydrated _____ that can be obtained in high purity in the laboratory.

Dibasic acid

Oxidation-reduction reactions are reactions in which _____ are transferred from one ion to another

Electrons

Oxidation-reduction reactions are also used in----- like the acid-base reactions

Titrimetric analysis

In redox titration involving potassium permanganate, if the contents of the conical flask turn brown, it means that _____ was added.

Insufficient acid catalyst

The equation for the redox reaction is, $X(aq) + 5C_2O_4^{2-}(aq) + 16H^+(aq) \rightarrow 2Mn^{2+}(aq) + 10CO_2(g) + 8H_2O(l)$. Identify the reactant X.

MNO-4

From the equation $MNO_4^-(aq) + 5C_2O_4^{2-}(aq) + 16H^+(aq)$ the mole ratio between the reactant is _____

5moles

Potassium permanganate is a self-indicating reagent because of its different characteristic _____ in either the acidic or basic medium

Colour changes

Potassium permanganate can be used to estimate the _____ of a substance.

percentage purity

$IO_3^- + SO_3^{2-} \rightarrow I^- + SO_4^{2-}$ The oxidation state of oxygen in the product's equation is _____
+6

$IO_3^- + SO_3^{2-}$ the oxidation state of oxygen in the equation is _____

Answer: +4

$CO + H_2SO_4 \rightarrow CO_2 + SO_2 + H_2O$ The elements which undergo change in oxidation state from the reactants to the products are _____

C and S

Volumetric analysis involving iodine are usually referred to as _____

Iodimetry

In the _____, standard solutions of iodine are used to estimate directly the concentrations of some oxidizable species.

Direct method

In the _____ the excess iodine ion that is deliberately produced in a reaction involving say potassium iodide in an acid medium is made to react with another oxidizing agent.

Indirect method

$2I^-(aq) \rightarrow I_2(aq) + 2e^-$. In this equation the liberated I_2 is now quantitatively determined by titration with standard _____ solution acting as reducing agent according to the equation below. $2S_2O_3^{2-}(aq) + I_2(aq) \rightarrow S_4O_6^{2-}(aq) + 2I^-$

Sodium thiosulphate

Of all the oxidizable species available for use, iodine titration are usually used with the _____

Thiosulphate

The colour changes accompanying the varying change in oxidation states of iodine and its ion can be used to indicate the _____

End point

The most commonly used _____ for iodine titration is starch solution.
external indicator

The starch solution forms a _____ complex with the tri-iodide ion during the titration that is rapidly discharged at the end point.

Blue black

Thus using starch as indicator, the colour variations of the solution depend on _____ formation of the starch with iodide ion formed in the last stage of the titration.

Complex

For this reason and in order to avoid complications in the end point detection, the starch indicator is added at the _____ colouration of the solution which is near the end point.

Light yellow

Complete the colour change in iodometry analysis. _____ (initially) →

Red-brown

_____ colouration is observed at near end point of the iodometry titration.

Light yellow

Oxidation involves the _____ of electrons

Lost

The oxidation potentials of Na is _____

 $Na + e \rightarrow Na^+ + 2.71$

The study of thermal changes in chemical and physical processes is known as _____

Thermochemistry

The _____ is the amount of heat released or observed for a given amount of reactants or products

Heat of reaction

The only acid suitable for use in redox titration involving potassium permanganate is dilute _____

Sulphuric acid

Nitric acid would compete with the permanganate ion for the reducing agent because itself is a

Strong oxidizing agent

Reduction reaction involves -----of electrons

Gain

Oxidation-reduction reactions involves a change in-----of both substances being determined

Oxidation state

Unlike acid-base reactions, redox procedure involves the use of-----

Catalyst or slight heat

When atoms of elements are in their free state their oxidation number is-----

Zero

In preparing a standard solution, two factors must be considered, namely:

1. The solute must be pure 2. The suitable solvent should be measure to a definite volume

A solution contains 1.2 Molar concentration, what volume of it must be diluted with water to give 600 mls of 0.5 Molar solution?

25 mls

In a chemistry laboratory a stoke bottle of acid solution reads, "1.25 specific gravity"; what does that mean?

1 cm³ of that solution weight 1.25 g

If 2 cm³ of a stoke solution contains 1 mole of an acid how would you prepare 1 molar concentration of that acid in 250 cm³ of water?

Dissolve 2 cm³ of the stoke solution in 248 cm³ of water

A substance which loses water of hydration upon exposure to atmosphere is called?

Efflorescence substance

A substance which takes in only moisture upon exposure to atmosphere is referred to as?

Deliquescent substance

A table of requirement for laboratory experiment contains the following except?

List of weight of each reagents

Give reason why water should not be added to acid during carrying out acid-base titration?

The dissolution of acid in water is exothermic which may cause explosion

The concentration of pure HCl 11.7 Molar if 20 cm³ of the acid is diluted to 250 cm³ to give concentration of 0.936 mol.dm³ substitute this values on this equation; $C_1V_1=C_2V_2$?

$$11.7 \times 20 = 0.936 \times 250$$

The point at which stoichiometrically equivalent quantities of substance have been brought together is known as?

Equivalence point of titration

Which of the following options is an indicator used for acid-base titration?

Methyl orange

In an acid base titration conducted by a student, the colour of the solution in the beaker changed from colourless to pink when phenolphthalein was used as an indicator, what went wrong?

The beaker was occupied by acid solution instead of base.

What is a PH of a solution?

It is the measure of hydrogen ions concentration in the solution

At neutralization point, the PH value is?

Seven

At complete neutralization point, the litmus paper colour turns?

Purple

Predict the colour of methyl orange when pH is 8?

Yellow

What is the colour of bromothymol when added to an acid solution?

Yellow

An indicator X was added to an acid solution in a beaker but no colour change was observed give the name of the indicator X?

Phenolphthalein

What is a strong acid?

Any acid that ionizes completely in solution

An example of a strong acid is?

H₂SO₄

What type of indicator will be suitable for use in a titration involving H₂SO₄ + NH₃(aq)?

Methyl orange

Which of these indicators will be suitable for use in a titration involving a weak acid and a strong base?

Phenolphthalein

What is the implication of adding a phenolphthalein as an indicator during the titration of HCl against Na₂CO₃?

The end point will appear when only half of Na₂CO₃ has been used

What is the importance of back titration?

To determine the concentration of a substance that is in excess after a chemical reaction.

A 25 ml solution of 0.5 M NaOH is titrated until neutralized into a 50 ml sample of HCl?

0.25 mol

A student used a hard tap water and performed an acid base titration. In few lines explain what would happen to his result?

the starting solution would be more alkaline therefore it would require more volume of acid than expected

Choose the most suitable water for use in acid base titration?

Deionised water

Both molarity and normality are measures of concentration. True or false?

True

During acid-base titration sulphuric acid would be dissociated into what ions?

2H⁺ + SO₄²⁻

What is a titrand in titration analysis?

Unknown concentration of an analyte

What is a titrant in titration analysis?

Known concentration and volume of an analyte

Which of these is a method of finding the equivalence point?

All of the options

When performing acid-base titration, one should first?

Rinse the burette twice with acid solution

The equation $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$ is a _____?

Neutralization reaction

The following are advantages of acid base titration except?

Less accuracy and precision

Question: The various methods of quantitative analysis include

Answer: Gravimetric spectrophotometric and volumetric methods

Question: The study of thermal changes in chemical and physical processes is known as

Answer: Thermodynamics

Question: In case of acid spill on the eye what will you apply after flushing your eye with large amount of water

Answer: 50 percent sodium bicarbonate

Question: Define molality of a solution

Answer: The number of moles of solute in one kilogram of solution

Question: Why do we heat precipitates during gravimetric analysis

Answer: To dry the precipitates

Question: Complete the colour change in iodometry analysis initially

Answer: Red brown

Question: For this reason and in order to avoid complications in the end point detection the starch indicator is added at the colouration of the solution which is near the end point

Answer: Light yellow

Question: One of these is not a benefit of heating substance in the laboratory

Answer: purification

Question: The process of converting ions in solution to insoluble solute is referred to as

Answer: precipitation

Question: The most commonly used external indicator for iodine titration is

Answer: starch solution

Question: In the standard solutions of iodine are used to estimate directly the concentrations of some oxidizable species

Answer: Direct method

Question: Thus using starch as indicator the colour variations of the solution depend on formation of the starch with iodide ion formed in the last stage of the titration

Answer: Complex

Question: The starch solution forms a complex with the tri iodide ion during the titration that is rapidly discharged at the end point

Answer: Blue black

Question: This is the amount of heat released or observed for a given amount of reactants or products

Answer: heat of reaction

Question: Of all the oxidizable species available for use iodine titration are usually used with the

Answer: Thiophsulphate

Question: The oxidation potentials of Na is

Answer: 2.71

Question: The point at which stoichiometrically equivalent quantities of substance have been brought together is known as

Answer:Equivalence point of titration

Question: IO₃²⁻ SO₃²⁻ the oxidation state of oxygen in the equation is

Answer:4

Question: In redox titration involving potassium permanganate if the contents of the conical flask turn brown it means was added

Answer:Insufficient acid catalyst

Question: Volumetric analysis involving iodine are usually referred to as

Answer:iodometry

Question: A substance which loses water of hydration upon exposure to atmosphere is called

Answer:Efflorescence substance

Question: Potassium permanganate is a self indicating reagent because of its different characteristic in either the acidic or basic medium

Answer:Colour change

Question: The colour changes accompanying the varying change in oxidation states of iodine and its ion can be used to indicate the

Answer:end point

Question: Which of the following options is an indicator use for acid base titration

Answer:Methyl orange

Question: Potassium permanganate can be used to estimate the of a substance

Answer:percentage purity

Question: IO₃²⁻ SO₃²⁻ I SO₄²⁻ The oxidation state of oxygen in the products equation is

Answer:6

The Bunsen burner regulator can be adjusted to produce a ----- flame.

Non-luminous

Electric oven can also be referred to as ----- oven.

Drying

If corrosive fumes may evolve during evaporation, the process must be carried out in a -----.

Fume hood

The most conventional size for volumetric work is the 250ml -----

Conical flask

Liquid reagent should be taken with the help of -----.

Droppers

The ----- is the basic unit for the quantity of a substance.

Mole

The three different techniques in titrimetric analysis are direct, indirect and ----- titration.

Back

Aluminium is ----- reactive than calcium.

Less

A substance that lose electron is said to be -----

Oxidized

The more ----- the potential, the easier the oxidation will be.

Positive

Heat of ----- is the amount of heat released or absorbed for a given amount of reactant or products.

Reaction

The ----- is used to measure the heat of reaction.

Calorimeter

----- are volumetric analysis involving iodine.

Iodimetry

KMnO₄ is characteristically ----- in both acid and base media.

Coloured

In ----- reactions , oxidation and reduction occurs simultaneously

Redox

The two balanced ----- equations should add up to give redox equations.

Half

Phenolphthalein can be used in the titration of HCl and NaOH since the titration is between ----- acid and strong base.

Strong

When standard solution directly reacts with the substance being determined, the titration is said to be -----
-- titration.

Direct

Each types of titrimetric analysis is based on certain types of -----.

Reaction

Titration results are best recorded in ----- decimal places.

Two

----- of a substance is achieved by titrating the approximate concentration with standard solution of known concentration.

Standardization

Is it practically possible to prepare a solution of high concentration from a solution of lower concentration?

NO

A solution contains 2.65g of anhydrous sodium carbonate in 125ml of solution, what is its concentration in mole per dm cube?

0.2

A standard solution is prepared by weighing a ----- solute and dissolving it in a suitable solvent.

Pure

The equivalent weight of solute per volume of solution in dm³ is termed -----

Normality

Sometimes precipitates are heated to a high temperature to convert it into a ----- of constant composition.

Compound

Ash less filter paper leaves little residue on -----.

Ignition

For laboratory purpose, filter papers of ----- grades are generally made.

Three

Proper ----- of filter paper can increase the rate of filtration.

Folding

An antidote should be given only to a person that swallow ----- poisons.

Non-corrosive

When you are very careful and follow all the laboratory rules of safety ,all accidents in the laboratory will be avoided. True or False

False

A ----- notebook should be used for laboratory record.

Bound

Ordinary filtration can be speeded up by the use of ----- filtration.

Suction

Care must be taken so that the liquid does not ----- violently while evaporating in a boiling tube.

Bump

Conical flask is the container in which the ----- meet and the products is/are formed.

Reactants

One of the following causes mental confusion

CHCl₃

Which of the following is most dangerous to the skin?

HF

Bunsen burner can be adjusted to a moderately high temperature of about _____.

600 oC

Which of these operations is performed in wet chemical analysis?

Precipitation

The number of moles of solute in one kilogram of solution is called _____

Molality

All pure substance have the following characteristics except _____.

Readily soluble in water

There are _____ types of titrimetric analysis.

Four

Which indicator is suitable for the titration of ethanoic acid and ammonia.

None

Which of the following metals has the least oxidation potential?

Ag

A reaction involving iron and copper ions, which of the ions will be oxidized?

Fe

The reaction is _____ when the reaction vessel feels warmer.

exothermic

The amount of heat required to raise the temperature of one mole of substances through one degree Celsius is called _____.

Molar heat capacity

Displacement reactions are usually _____.

oxidized

The most commonly used external indicator for iodine titration is _____.

starch

It is very difficult to read the meniscus of potassium permanganate solution in burette because _____.

Of its intense colouration

Which of these acid is suitable to catalyze permanganate reaction?

Sulphuric acid

Oxidation is defined as the _____

Loss of electron

Given the equation, $C + H_2SO_4 \rightarrow CO_2 + SO_2 + H_2O$, the oxidation number of sulphur decrease by _____.

2

The oxidation number of sulphur in H_2SO_4 is _____.

4

H_2O_2 is oxidized by MnO_2 to give _____.

O₂

Volumetric method of analysis measures _____.

Volume of a gas or volume of solution of unknown concentration

The concept of _____ method is used in the preparation of a solution of lower concentration from higher concentration

Dilution

Which of the following is true of molar and molal concentration of sodium carbonate?

Molal concentration is higher

Precipitation is common to _____ analysis.

Gravimetric

What should be given to a person that swallowed corrosive poison as soon as possible?

Calcium hydroxide solution

Burns caused by bromine can be treated with _____

Ammonia

Burns are mostly caused by _____.

Hot equipment and reagents

What is the molar concentration of a solution containing 2.5g of potassium hydroxide in 200cm³ of solution. (K = 39, H=1, O=16)

0.22mol/dm³

In a titration, 25cm³ of an impure anhydrous sodium trioxocarbonate (iv) containing 5.0g in 1dm³ of solution was neutralized by 22.20cm³ of 0.10mol/dm³ of HCl, find the mass concentration of the trioxocarbonate (iv).

4.71g/dm³

A molar solution of caustic soda is prepared by dissolving _____.

40g NaOH in 1000g of water

What volume of 0.5M sulphuric acid will exactly neutralize 20cm³ of 0.1M NaOH solution?

2.0 cm³

In which type of titration is two standard solution needed?

Back

The volume of acid used is usually _____

Average titre value

All electron donors are normally _____.

Reducing agent

At what reaction condition will the absolute value of enthalpy equals the absolute value of heat of reaction?

Constant pressure