CHEMISTRY

Unit 15

BASIC SEPARATION TECHNIQUES

MCQs • Short Questions • Long Questions

Complete Study Booklet with Answer Keys

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Section 1 | Multiple Choice Questions

Tick the correct option. Correct answers are highlighted in green with a check mark.

1. After the crystals are formed, they are typically separated from the mother liquor by:

(a) Evaporation
✓ **(b) Decantation or filtration**
(c) Sublimation
(d) Distillation

2. The comparative rates at which the solutes move in paper chromatography depend on:

(a) Size of filter paper
✓ **(b) Rf values of solutes**
(c) Temperature
(d) Size of the chromatographic jar

3. The method that can be used to separate two solid compounds with different solubilities in a solvent is:

(a) Distillation
(b) Isolation
✓ **(c) Crystallization**
(d) Filtration

4. It is suspected that a hand-written legal document has been changed by overwriting some crucial figures. Which technique you will use to check the inks used at suspected places?

(a) Distillation
✓ **(b) Chromatography**
(c) Solvent Extraction
(d) Crystallization

5. In chromatography, the components of the mixture are separated based on:

(a) Their molecular masses
✓ **(b) The interaction of the components with stationary as well as mobile phases**
(c) The type of solvent used
(d) The filter paper used

6. The porous material used to separate the solid from the liquid during filtration is called the:

(a) Filtrate
(b) Residue
✓ **(c) Filter medium**
(d) Solvent

7. The key difference between simple distillation and fractional distillation is the presence of:

(a) Condenser with a larger surface area
(b) More powerful heat source
✓ **(c) Fractionating column**
(d) Vacuum pump

8. The essential requirement for separating two liquids by simple distillation is that their boiling points should differ by at least:

(a) 5 deg C
(b) 10 deg C
✓ **(c) 25 deg C**

(d) 50 deg C

9. Which of the following is a physical method of separation?

(a) Filtration
(b) Crystallization
(c) Distillation
✓ **(d) All of these**

10. Which one is faster process?

(a) Gravity filtration
✓ **(b) Vacuum filtration**
(c) Filtration by simple filter paper
(d) Filtration by fluted filter paper

11. The pore size of filter paper depends upon:

(a) Size of funnel
✓ **(b) Size of precipitate**
(c) Do not depend on anything
(d) Nature of liquid

12. Normally in filtration process, funnel used is:

(a) 30 deg
✓ **(b) 60 deg**
(c) 90 deg
(d) 120 deg

13. The good insoluble precaution which should be used for solutions that react with paper:

(a) Filter paper
(b) Do not filter
✓ **(c) Asbestos mat**
(d) Cannot be answered

14. Filtration is used to separate:

✓ **(a) Solids from liquids**
(b) Liquids from liquids
(c) Gases from liquids
(d) Solids from gases

15. Which one is NOT an example of filtration?

(a) Separating tea leaves from tea
(b) Purifying drinking water
✓ **(c) Separating petrol from diesel**
(d) Removing dust from air in vacuum cleaners

16. In water treatment plants, filtration usually follows:

✓ **(a) Sedimentation**
(b) Distillation
(c) Sublimation
(d) Chromatography

17. An ideal solvent should be:

(a) Inexpensive
(b) Safe
(c) Easy to move
✓ **(d) All of these**

18. For colored impurities in crystals, which of the following should be used?

(a) Filter paper
✓ **(b) Animal charcoal**
(c) Gooch crucible
(d) Distillation

19. Evaporation can be used to separate:

✓ **(a) Salt from seawater**
(b) Oil from water
(c) Sand from gravel
(d) Alcohol from water

20. In crystallization, the crystals form due to:

(a) Freezing of water
✓ **(b) Cooling of a hot saturated solution**
(c) Evaporation at room temperature
(d) Boiling at low pressure

21. Petroleum is separated by:

(a) Simple distillation
(b) Crystallization
✓ **(c) Fractional distillation**
(d) Filtration

22. Boiling point of Ethyl Alcohol is:

(a) 100 deg C
(b) 83 deg C
✓ **(c) 78 deg C**
(d) 98 deg C

23. Which separation technique uses differences in boiling points?

(a) Chromatography
✓ **(b) Distillation**
(c) Filtration
(d) Centrifugation

24. Distillation separates liquids based on differences in:

(a) Density
(b) Colour
✓ **(c) Boiling point**
(d) Solubility

25. Which apparatus part condenses vapour back to liquid in distillation?

(a) Bunsen burner
✓ **(b) Condenser**
(c) Thermometer
(d) Funnel

26. Which of the following is separated by fractional distillation?

✓ **(a) Air into nitrogen and oxygen**
(b) Salt from seawater
(c) Sand from iron
(d) Sugar from water

27. In petroleum refining, fractional distillation separates fractions based on:

(a) Melting point
✓ **(b) Boiling point**
(c) Density
(d) Viscosity

28. In distillation, heating should be done:
(a) Vigorously
(b) Very fast
✓ **(c) Gently and steadily**
(d) With high pressure

29. In paper chromatography mobile phase is:
✓ **(a) Organic liquid**
(b) Water
(c) Inorganic liquid
(d) All of these

30. How many arrangements are there for paper chromatography?
(a) 1
(b) 2
✓ **(c) 3**
(d) 4

31. Which Whatmann's chromatographic paper is used for paper chromatography?
✓ **(a) No. 1**
(b) No. 0
(c) No. 10
(d) No. 4

32. In paper chromatography, paper should be dipped in solvent up to:
(a) 2-5 mm
✓ **(b) 5-6 mm**
(c) 5-6 cm
(d) None of these

33. In paper chromatography Amino Acids can be located by:
(a) Salicylic acid
(b) Aspirin
(c) KMnO4
✓ **(d) Ninhydrin**

34. In chromatography, a locating agent is used to:
(a) Dissolve the sample for separation
(b) Carry the separated components along the stationary phase
✓ **(c) Make colorless separated components visible for identification**
(d) Prevent the sample from interacting with the stationary phase

35. Paper chromatography is often used to separate:
(a) Salt from water
✓ **(b) Pigments in ink**
(c) Petrol from kerosene
(d) Nitrogen from air

36. In paper chromatography, the stationary phase is:
(a) Solvent

✓ (b) Paper
(c) Ink
(d) Air

37. The mobile phase in paper chromatography is:
(a) Paper
✓ (b) Solvent
(c) Pigment
(d) Water vapour

38. Rf value in chromatography is:
(a) Ratio of distance moved by solvent to sample
✓ (b) Ratio of distance moved by sample to solvent front
(c) Distance moved by paper
(d) Distance moved by baseline

39. Which of the following can be used to check the purity of a substance?
(a) Crystallization
✓ (b) Quantitative Analysis
(c) Filter paper
(d) Chromatography

40. Melting point of Aspirin is:
✓ (a) 136 deg C
(b) 126 deg C
(c) 236 deg C
(d) 158 deg C

41. The formula of Salicylic Acid is:
✓ (a) C6H4(OH)COOH
(b) C6H6O
(c) C7H6O3
(d) C8H8O3

42. Aspirin is used as:
(a) Analgesic
(b) Antipyretic
✓ (c) Both A & B
(d) None of these

43. Which of the following is the main purpose of separation techniques?
(a) Mixing substances
✓ (b) Purifying substances
(c) Heating substances
(d) Cooling substances

Section 2 | Short Questions

Q1. Why is there a need to crystallize a crude product?

During a chemical reaction, products are usually mixed with some reactant and side products - this is called a crude product.

Since the crude product is impure, crystallization must be carried out to purify it.

Q2. What is the function of fluted filter paper?

Filter paper folded in an accordion shape gives fluted filter paper, with alternate elevations and depressions.

This considerably increases the rate of filtration through a conical funnel.

Q4. What type of mixtures is filtered through a Gooch crucible?

A Gooch crucible is useful for separating mixtures that need to be ignited at high temperature.

If its perforations are covered with asbestos mat, it can also be used to filter solutions that react with paper (e.g. concentrated HCl and $KMnO_4$ solutions).

Q5. What is the function of a fractionating column during fractional distillation?

For fractional distillation of petroleum, a fractionating tower is used.

Different fractions are obtained at different heights along the column depending on their boiling points - the fraction with the lowest boiling point is collected at the top.

Q6. What is the stationary phase in paper chromatography?

The stationary phase may be a solid or a liquid supported as a thin film on an inert solid.

In paper chromatography, water entrapped in cellulose fibers acts as the stationary phase.

Q7. What happens in paper chromatography if components have comparable attraction for the stationary phase?

If components have comparable attraction for the stationary phase, they travel equal distances along the paper, appear as a single dot, and are not separated.

Q8. What is meant by 'developing the chromatogram' in paper chromatography?

Immersing the paper in the mobile phase; moving the mobile phase over the stationary phase by capillary action; drying the paper; then identifying the compounds.

Q9. What is the basic principle of paper chromatography?

Chromatography is based on the principle that the distance travelled by mixture components depends on their distribution between the stationary and mobile phases.

Q10. Why is water not generally used as a solvent in paper chromatography?

Water has high polarity comparable to that of cellulose fibers, and chromatography usually focuses on organic compounds that are typically insoluble in water.

Q12. How can you check the purity of a compound using paper chromatography?

Paper chromatography checks purity using a suitable solvent in which the substance dissolves.

A pure substance produces one spot on the chromatogram, while an impure substance produces more than one spot.

Q13. How would you check the purity of a prepared solid sample of glucosazone?

Glucosazone is a yellow crystal. Purity can be checked by: (i) Chromatography - pure glucosazone gives only one spot.

(ii) Melting point - a sharp, fixed melting point of 204 deg C indicates purity; a range of temperatures indicates an impure sample.

Q14. Write the four steps of quantitative determination.

Obtaining a sample for analysis; separation of the desired constituent; measurement and calculation of results; drawing conclusions from the analysis.

Q15. Write the major methods of physical separation.

Filtration, crystallization, simple distillation, fractional distillation, and paper chromatography.

Q16. Define solute and solvent.

Solute: the substance present in lesser amount in a solution (e.g. salt in a salt solution).

Solvent: the substance present in larger amount in a solution (e.g. water in a salt solution).

Q18. What is meant by separation techniques?

Methods used to separate different components of a mixture, working on differences in physical properties like boiling point, density, or solubility - helping obtain pure substances (e.g. filtration, distillation, chromatography).

Q19. Define filtration and how to increase the rate of filtration.

Filtration: the process used to separate one component of a two-component heterogeneous mixture from a solution.

Rate can be increased by using fluted filter paper or suction (vacuum) filtration.

Q20. How can salt be separated from a salt-sand mixture?

Add water to dissolve the salt; filter to remove the sand; evaporate the water from the salt solution; pure salt crystals are obtained.

Q21. Why is filtration important in water treatment?

It removes suspended solids, makes water clearer and safer to drink, is usually done after sedimentation, and prevents clogging in later treatment stages.

Q23. What is the benefit of a crucible over filter paper?

Quick filtration using a suction filtering apparatus; useful for precipitates that need to be ignited at high temperature; if covered with asbestos mat, can filter solutions that react with paper.

Q24. Which pore size should be used for filtration? How to decide?

Filter papers come in a variety of porosities. The pore size to use depends on the size of particles in the precipitate.

Q25. What is Whatmann's filter paper?

Made from specially selected cotton cellulose. Whatmann's No. 1 is used for routine applications, with medium retention and medium flow rate, and a pore size of 11 micrometers.

Q26. How are colored impurities removed during crystallization?

By boiling the substance in the solvent with finely powdered animal charcoal, then filtering the hot solution.

Colored impurities are adsorbed by the charcoal, and the pure decolorized substance crystallizes out from the filtrate on cooling.

Q27. What is crystallization?

The process of forming pure solid crystals from a solution by cooling a hot saturated solution.

Gives purer solids than evaporation; used to purify sugar, salt, and copper sulfate.

Q28. What precaution should be taken with a flammable solvent during crystallization?

A water bath should be used for heating, to avoid the flammable solvent catching fire.

Q29. Why is a vacuum desiccator used?

Used for temperature-sensitive crystals - crystals are spread on a watch glass and kept in the desiccator with drying agents like CaCl2, silica gel, or P2O5.

Q30. Why is a hot water funnel used in crystallization?

To prevent crystals from forming prematurely during filtration and choking the filter paper or funnel.

Q31. How is petroleum separated?

Petroleum is a mixture of compounds (petrol, diesel, kerosene, furnace oil) with boiling points not very different from each other, separated as fractions by fractional distillation using a fractionating/distillation column.

Q32. What is the use of fractional distillation in air separation?

Produces pure nitrogen, oxygen, and argon: liquid air is fractionally distilled at low temperature; nitrogen boils off first (lower boiling point), then oxygen and argon are collected.

Q33. Why is fractional distillation more efficient than simple distillation?

Its fractionating column provides surfaces for repeated condensation, allowing better separation of liquids with close boiling points and purer fractions - used in petroleum and air separation.

Q35. Graphically elaborate fractional distillation using ethyl alcohol and water.

Ethyl alcohol (boiling point 78 deg C) distills over first, before water (boiling point 100 deg C).

As long as alcohol is distilling over, the thermometer stays at 78 deg C.

Q36. What is distillation?

Separates liquids based on differences in boiling points - the mixture is heated until one component boils and vaporizes, then the vapour is condensed back into liquid. Used to obtain pure water from seawater.

Q38. How can invisible substances be visualized during paper chromatography?

UV lamp: spots appear coloured under UV light.

Locating agent: a chemical that reacts with colourless substances to give coloured products, e.g. ninhydrin for amino acids.

Q39. What is the use of chromatography in forensic science?

Identifies substances in crime evidence; ink from documents can be analysed; blood and drug samples can be tested; helps in criminal investigations.

Q40. What is the mobile phase in chromatography?

The solvent that moves up the paper, carrying the mixture with it - components travel at different rates, causing separation.

Q41. What is the stationary phase in chromatography?

The paper on which the mixture is placed - it holds substances based on adsorption, and different substances stick to it differently, aiding separation.

Q43. What is Rf value in chromatography?

The ratio of the distance moved by the substance to the distance moved by the solvent front. Always less than 1; helps identify unknown substances, since different compounds have different Rf values.

Q45. What is the retardation factor?

The ratio of the distance travelled by a component from the original spot to the distance travelled by the solvent from the original spot.

Rf = (distance travelled by component) / (distance travelled by solvent).

Q46. Why do we need to separate substances?

To remove unwanted materials from useful substances; to purify chemicals for industrial and laboratory use; important for safety, health, and quality control.

Q47. How is air separated into its components?

Air is cooled until it liquefies; fractional distillation is used at very low temperatures - nitrogen boils off first, followed by oxygen and argon; used for industrial gas supply.

Section 3 | Descriptive Questions

Q3 (Descriptive). Differentiate simple distillation and fractional distillation in construction and applications.

Simple distillation purifies a liquid by heating it to boiling, vaporizing, then condensing the vapour back to liquid - suitable for a dissolved solid in a solvent (e.g. purifying seawater).

Fractional distillation uses a fractionating column packed with glass beads (or similar) to give repeated condensation surfaces, separating miscible liquids with boiling points around 25 deg C apart or closer - e.g. separating petroleum fractions or ethanol/water.

Q4 (Descriptive). Describe the criteria to choose a suitable solvent for crystallization.

An ideal solvent should: dissolve a large amount of solute at boiling point but only a small amount at room temperature; not react chemically with the solute; not dissolve the impurities (or not let them crystallize); deposit well-formed crystals; and be inexpensive, safe, and easily removable.

Common solvents: water, absolute ethanol, rectified spirit, chloroform, carbon tetrachloride, acetic acid, methanol, and benzene.

Q5 (Descriptive). What is the basic principle of paper chromatography? Give three practical applications.

Principle: the distance travelled by mixture components depends on their distribution between the stationary phase (water in cellulose fibers) and the mobile phase (an organic solvent).

Applications: (1) separating pigments in ink for forensic ink analysis; (2) checking the purity of chemical products (pure substances give one spot); (3) identifying amino acids and other biomolecules using locating agents like ninhydrin.

Section 4 | Long Questions

Q1. What is analytical chemistry? Explain the types and steps of analysis.

Analytical Chemistry

Definition: analytical chemistry is the science of chemical characterization.

A complete chemical characterization of a compound must include both qualitative and quantitative analysis.

Types of Analysis

(i) Qualitative Analysis: concerned with detecting or identifying the elements present in a compound. Example: identifying that glucose contains C, H, and O.

(ii) Quantitative Analysis: determines the relative amounts of elements in a compound. Example: glucose ($C_6H_{12}O_6$) contains 6 carbon, 12 hydrogen, and 6 oxygen atoms (24 atoms total).

Steps of Analysis

A complete quantitative determination generally consists of four major steps: obtaining a sample for analysis; separation of the desired constituent; measurement and calculation of results; and drawing conclusions from the analysis.

Q2. Define filtration. Explain the various filter media.

Filtration

Definition: the process used to separate one component of a two-component heterogeneous mixture from a solution.

Example: a mixture of common salt and sand dissolved in distilled water - salt dissolves to form a solution while sand remains undissolved; filtration separates the sand from the solution.

First step: select a suitable solvent in which one component dissolves completely while the other remains practically insoluble.

(a) Filtration Using Filter Paper

Folding: first fold along the diameter; second fold so edges don't quite match, forming a cone; insert into a 60-degree funnel, moisten with water, and press down firmly.

Simple filter paper is a slower process; fluted filter paper (with alternate elevations and depressions, fan-like) considerably increases the filtration rate.

Key terms: filtrate (the liquid collected in the flask below the funnel); residue (the precipitate left on the filter paper).

(b) Filtration Using Crucible

Gooch crucible: made of porcelain with a perforated bottom, covered with paper pulp or filter paper; allows quick filtration by suction; useful for precipitates needing high-temperature ignition; if covered with asbestos mat, can filter solutions that react with paper (e.g. concentrated HCl, $KMnO_4$).

Sintered glass crucible: a glass crucible with a porous glass disc sealed into the bottom; very convenient since no preparation is needed.

Q3. What is crystallization? Explain the selection of solvent and steps of crystallization.

Crystallization

Definition: the removal of solid from a solution by increasing its concentration above the saturation point, so the excess solid separates out as crystals.

Principle: the solute should be soluble in a suitable solvent at high temperature, and the excess solute is thrown out as crystals when cooled.

Choice of Solvent

An ideal solvent should: dissolve a large amount at boiling point but a small amount at room temperature; not react chemically with the solute; not dissolve impurities; deposit well-formed crystals; and be inexpensive and safe.

Common solvents: water, absolute ethanol, rectified spirit, chloroform, carbon tetrachloride, acetic acid, methanol, benzene.

Precautions: use a hot water funnel if crystals start forming during filtration (to avoid choking the filter/funnel); use a water bath for heating if the solvent is flammable.

Steps of Crystallization

Step 1 - Saturated solution: prepare a saturated solution of the substance in a suitable solvent at experiment temperature.

Step 2 - Removing impurities: filter the hot saturated solution to remove insoluble impurities, avoiding premature crystallization; use a hot water funnel if needed.

Step 3 - Cooling: cool the hot filtered solution at a moderate rate to allow medium-sized crystals to form.

Step 4 - Separating crystals: filter the crystal/mother liquor mixture through a Gooch crucible using a vacuum pump. Coloured impurities can be removed by boiling with animal charcoal before this step, then filtering.

Step 5 - Drying: either oven-dry at 100 deg C (if the substance doesn't melt/decompose), or use a vacuum desiccator (safer) with crystals spread on a watch glass and drying agents like CaCl2, silica gel, or P2O5.

Q4. What are the types of distillation? Explain the distillation process in detail.

(i) Simple Distillation

Definition: purifies a liquid by heating it to its boiling point, turning it to vapour, and condensing it back to liquid, separating it from impurities.

Used when a solid compound is dissolved in water or another solvent. Example: distilling seawater to make it drinkable (removing dissolved inorganic compounds).

Procedure: take the mixture (e.g. 100 cm3 seawater); add boiling chips to prevent bumping; make the apparatus air-tight; heat the flask gently; circulate cold water around the condenser; the liquid evaporates at its boiling point, vapours pass through the condenser and condense, and the distillate is collected in a receiving flask, leaving behind the residue.

(ii) Fractional Distillation

Definition: separates components of a liquid mixture based on their different boiling points - used for liquids that are soluble/miscible with each other. Example: separating water and ethyl alcohol.

Conditions for success: boiling point difference should be around 25 deg C.

Distillation column: glass equipment filled with glass beads to increase surface area for repeated condensation; different components condense at different heights based on boiling point.

Q5. What is chromatography? Discuss its classification and applications.

Chromatography

Definition: a method primarily used for separating a mixture, involving the distribution of a solute (mixture) between a stationary phase and a mobile phase.

Stationary phase: may be a solid or a liquid supported as a thin film on an inert solid. Mobile phase: flows over the stationary phase; may be a gas or a liquid.

Types of Chromatography

(i) Adsorption Chromatography: stationary phase is a solid; the substance leaves the mobile phase to adsorb onto the solid surface. Examples: TLC, Column Chromatography.

(ii) Partition Chromatography: stationary phase is a liquid; substances are distributed throughout both phases. Examples: Paper Chromatography, Gas-Liquid Chromatography.

Applications of Chromatography

Separation: useful in organic synthesis for separating, isolating, and purifying products.

Analysis: important for qualitative/quantitative analysis and determining purity.

Identification: useful for identifying complicated chemicals such as dyes, drugs, and pesticides.

Q6. Explain the basic principle and process of paper chromatography.

Principle

Chromatography is based on the principle that the distance travelled by mixture components depends on their distribution between the stationary and mobile phases.

Paper chromatography is a type of partition chromatography. Stationary phase: entrapped water in the cellulose fibers of paper. Mobile phase: usually an organic liquid, immiscible with water.

Types: ascending (solvent travels upward by capillary action), descending, and radial/circular.

Steps of Paper Chromatography

Step 1: pour the solvent mixture into the chromatographic tank.

Step 2: cover the tank to homogenize its inner atmosphere.

Step 3: take a strip (about 20 cm) of Whatmann's chromatographic paper No. 1; draw a pencil line about 2.5 cm from one end; spot the sample mixture on this line (with known compound spots alongside if needed).

Step 4: suspend the paper so the end dips into the solvent (5-6 mm depth); as the solvent front passes the spots, solutes move upward at different rates.

Step 5: when the solvent front reaches about two-thirds of the paper's length, remove the strip, mark the solvent front with pencil, and let it dry.

Step 6: for colorless components, use a UV lamp (spots appear coloured under UV) or a locating agent (a chemical reacting with colourless substances to give coloured products, e.g. ninhydrin for amino acids).

Retardation Factor (Rf)

Rf = (distance travelled by a component from the original spot) / (distance travelled by solvent from the original spot).

Application: a pure substance produces one spot; an impure substance produces more than one spot; two substances with the same Rf value are likely to be identical.

Q7. How is the purity of a substance checked?

Checking Purity

Different methods apply depending on whether the compound is liquid or solid under normal conditions.

Purity of liquids: liquids are generally purified by distilling at normal pressure or under vacuum; purity is checked by comparing boiling points.

Checking Purity of Aspirin (Example)

Preparation: salicylic acid + excess acetic anhydride + a few drops of concentrated H_2SO_4; water is added afterward to precipitate aspirin, which is filtered to give a crude product, then crystallized in water. Aspirin is an important analgesic and antipyretic.

Methods to Check Purity

(i) Sharp melting point: if the product melts sharply at exactly 136 deg C, it is pure; melting over a range indicates impurity.

(ii) Mixed melting point: mix the product with a pure aspirin sample and determine the melting point - if it still shows a sharp melting point, the product is pure.

(iii) Paper chromatography: run the sample alongside pure samples of aspirin and salicylic acid, and match Rf values.

Section 5 | Answer Key & Formula Summary

MCQ Answer Key (Q1-Q43)

Q.No	Ans	Q.No	Ans	Q.No	Ans	Q.No	Ans
1	B	12	B	23	B	34	C
2	B	13	C	24	C	35	B
3	C	14	A	25	B	36	B
4	B	15	C	26	A	37	B
5	B	16	A	27	B	38	B
6	C	17	D	28	C	39	B
7	C	18	B	29	A	40	A
8	C	19	A	30	C	41	A
9	D	20	B	31	A	42	C
10	B	21	C	32	B	43	B
11	B	22	C	33	D		

Important Formulas

Formula	Description
Rf = Distance travelled by component / Distance travelled by solvent	Retardation factor in paper chromatography
Rf(A) = x/z, Rf(B) = y/z	Example Rf calculation for two components A and B

Key Constants & Notes

Constant/Note	Value
Boiling point difference needed for simple distillation	at least 25 deg C
Boiling point of ethyl alcohol	78 deg C
Boiling point of water	100 deg C
Standard funnel angle for filtration	60 degrees
Whatmann filter paper No. 1 pore size	11 micrometers
Paper dipped in solvent (paper chromatography)	5-6 mm depth
Melting point of Aspirin	136 deg C
Melting point of Glucosazone	204 deg C
Formula of Aspirin	C9H8O4
Formula of Salicylic Acid	C6H4(OH)COOH
Drying agents used in vacuum desiccator	CaCl2, silica gel, P2O5

Filter Media Comparison

Filter Medium	Material	Key Feature
Simple Filter Paper	Cellulose	Slow filtration
Fluted Filter Paper	Cellulose	Faster filtration (fan-like folds)
Gooch Crucible	Porcelain	For precipitates needing ignition at high temperature
Sintered Glass Crucible	Glass	No preparation needed, very convenient

Types of Chromatography

Type	Stationary Phase	Examples
Adsorption Chromatography	Solid	Thin Layer Chromatography (TLC), Column Chromatography
Partition Chromatography	Liquid	Paper Chromatography, Gas-Liquid Chromatography

Crystallization Solvent Selection Criteria

Criterion	Requirement
Solubility behaviour	Dissolves a large amount of solute at boiling point, but only a small amount at room temperature
Chemical compatibility	Should not react chemically with the solute
Impurity behaviour	Should not dissolve impurities (or impurities should not crystallize with the solute)
Crystal quality	Should deposit well-formed crystals
Practicality	Should be inexpensive, safe, and easily removable

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