CHEMISTRY MCQ BOOKLET

Grade 9 · Chapter 17 · Separation Techniques

FBISE / National Book Foundation Model Textbook companion

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Independent MCQs on mixtures, evaporation, distillation, filtration, crystallization, and purity from melting and boiling points. Not copied from the book exercise. Total: 108 questions. Each item has four options, the correct letter, and a teaching explanation.

A. Important / Main Topics

1. Most everyday materials are mixtures of elements and/or compounds that are:

(A) not chemically combined
(B) always chemically bonded as one new element
(C) always a single pure crystal
(D) impossible to separate physically

Correct Answer: A

Explanation: A mixture keeps the original substances together physically, so physical methods can often separate them.

2. A solvent is the component that:

(A) is always the undissolved residue
(B) dissolves the solute and is usually present in greater amount
(C) is always the smaller component
(D) is the solid left on filter paper

Correct Answer: B

Explanation: The solvent is the dissolving medium of a solution and is commonly the component in larger amount.

3. A solute is the substance that:

(A) is always the liquid in greater amount
(B) is the filter paper
(C) is dissolved and is usually present in smaller amount
(D) is the vapour leaving a condenser

Correct Answer: C

Explanation: A solute is dispersed at particle level in a solvent and is commonly present in the smaller amount.

4. A solution is best described as:

(A) a mixture with visible undissolved layers only
(B) always an undissolved solid
(C) a mixture that cannot pass through filter paper
(D) a homogeneous mixture of solute and solvent

Correct Answer: D

Explanation: A solution is homogeneous because dissolved particles are distributed uniformly throughout the solvent.

5. A saturated solution at a stated temperature contains:

(A) the maximum solute that can dissolve
(B) no solute at all
(C) unlimited extra solute dissolving freely
(D) only a gas

Correct Answer: A

Explanation: A saturated solution is at the solubility limit, so added solute cannot continue dissolving at that temperature.

6. Residue in filtration is the:

(A) liquid passing through
(B) insoluble solid retained by the filter
(C) condensed distillate
(D) dissolved solvent only

Correct Answer: B

Explanation: Residue is made of particles too large or insoluble to pass through the pores of the filter.

7. Filtrate is the:

(A) solid on the paper
(B) fractionating column
(C) liquid that passes through the filter
(D) name of every impurity removed

Correct Answer: C

Explanation: Filtrate is the fluid collected after it has passed through the filter medium.

8. Gold panning separates dense gold from lighter material mainly by differences in:

(A) magnetism of gold
(B) chemical bonding of gold
(C) dissolved-salt colour
(D) density

Correct Answer: D

Explanation: Dense gold settles differently from lighter sand and gravel when water moves the mixture.

9. Gold panning became especially famous during gold rushes of the:

(A) 1840s
(B) 2000s only
(C) era of fractional distillation of air
(D) invention of HEPA filters

Correct Answer: A

Explanation: Gold panning became especially famous during gold rushes of the 1840s.

10. Choosing a separation method depends on property differences such as size, mass, density, magnetism, volatility, or:

(A) only the colour of the textbook
(B) affinity between constituents
(C) changing atomic number
(D) inventing a new element

Correct Answer: B

Explanation: The useful physical difference decides whether filtration, distillation, a magnet, or another method is appropriate.

11. Sand and sugar can be separated by dissolving the sugar, filtering the sand, then:

(A) magnetising the sugar
(B) distilling the sand first
(C) crystallising or evaporating the sugar solution
(D) using only a magnet

Correct Answer: C

Explanation: Sugar is soluble and sand is not, so dissolve–filter–recover exploits that solubility difference.

12. Filtration of sand and water works because of a difference in:

(A) boiling point of sand and water being identical
(B) magnetism of water
(C) complete dissolving of sand
(D) particle size, so water passes while sand is retained

Correct Answer: D

Explanation: Sand is an undissolved solid with particles large enough to be retained by filter paper.

13. Evaporation of a salt solution leaves the solid because the solvent:

(A) vaporizes much more readily than the dissolved solid
(B) is non-volatile while the salt vaporises first
(C) cannot change state
(D) is magnetic

Correct Answer: A

Explanation: Most ionic solids are non-volatile, so heating removes solvent while leaving solid behind.

14. Raising temperature generally:

(A) stops all molecular motion
(B) increases the evaporation rate
(C) always decreases evaporation
(D) affects only solids and never liquids

Correct Answer: B

Explanation: At higher temperature more molecules have enough kinetic energy to escape from the liquid surface.

15. A larger exposed surface generally:

(A) always decreases evaporation
(B) affects only boiling point and never evaporation
(C) increases the evaporation rate
(D) covers the liquid and hides molecules

Correct Answer: C

Explanation: A larger surface places more liquid molecules at the boundary where they can escape into the air.

16. Stronger intermolecular forces generally:

(A) make escape easier
(B) matter only in solids
(C) make all liquids evaporate equally
(D) decrease the evaporation rate

Correct Answer: D

Explanation: Molecules held by stronger attractions need more energy to escape, so the liquid evaporates more slowly.

17. Faster airflow of unsaturated air above a liquid usually:

(A) increases evaporation
(B) always condenses the liquid
(C) removes vapour most slowly
(D) changes solute into solvent

Correct Answer: A

Explanation: Moving air carries away vapour near the surface, so more liquid molecules can continue escaping.

18. Higher external pressure generally:

(A) always increases evaporation
(B) decreases the evaporation rate
(C) has no molecular effect
(D) prevents all solids from remaining

Correct Answer: B

Explanation: Greater external pressure makes escape of liquid molecules less favourable, so evaporation generally slows.

19. Industrial uses of evaporation include making juice concentrates, lactose powder, dyes, and:

(A) only magnetic filings
(B) only new elements
(C) recovered minerals from mineral-rich water

(D) only filter paper

Correct Answer: C

Explanation: Evaporation is useful when a solvent must be removed to concentrate a liquid or recover a solid product.

20. Seawater can yield drinking water by evaporation because water is:

(A) less volatile than dissolved salts
(B) identical in volatility to NaCl
(C) separated only by a magnet
(D) more volatile than dissolved salts

Correct Answer: D

Explanation: Water vaporises while salts remain, which is why solar or thermal evaporation can desalinate.

21. Distillation combines vaporization with:

(A) cooling and condensation
(B) filter paper only
(C) magnetism only
(D) no change of physical state

Correct Answer: A

Explanation: A component is vaporized and then condensed as collected liquid distillate.

22. Distillate is the:

(A) residue always left in the flask
(B) condensed liquid collected after vapour is cooled
(C) filter paper
(D) undissolved sediment

Correct Answer: B

Explanation: Distillate is the product formed when selected vapour passes into a condenser and returns to liquid.

23. A liquid boils when its vapour pressure:

(A) is zero
(B) equals its density
(C) equals atmospheric pressure
(D) is measured only at 0 °C

Correct Answer: C

Explanation: Boiling begins throughout a liquid when its vapour pressure becomes equal to the pressure above it.

24. In simple distillation a mixture is first heated in a:

(A) filter paper cone
(B) magnet
(C) receiver that is heated more strongly
(D) round-bottom flask

Correct Answer: D

Explanation: Heating supplies energy for the more volatile component to vaporize in the distillation flask.

25. The component that vaporizes first in distillation is the one with the:

(A) lower boiling point
(B) highest boiling point always
(C) greatest mass always
(D) least volatility

Correct Answer: A

Explanation: A lower boiling point indicates greater volatility, so that component enters the vapour phase first.

26. A condenser is used to:

(A) boil the least volatile residue
(B) remove heat from vapour so liquid can be collected

(C) filter solid particles by pore size
(D) increase vapour temperature continuously

Correct Answer: B

Explanation: A condenser is cooled so vapour loses thermal energy and changes back into liquid distillate.

27. Simple distillation is suitable for recovering a solvent from a solution or separating liquids with:

(A) identical boiling points perfectly
(B) only magnetic solids
(C) widely different boiling points
(D) no heating needed

Correct Answer: C

Explanation: Simple distillation works well when one volatile liquid is separated from non-volatile solute or a wide boiling gap.

28. Fractional distillation separates miscible liquids whose boiling points are:

(A) exactly identical always
(B) irrelevant
(C) used only for sand
(D) relatively close

Correct Answer: D

Explanation: Fractional distillation separates miscible liquids whose boiling points are relatively close.

29. In a fractionating column the temperature is:

(A) hotter at the bottom and cooler at the top
(B) hottest at the top
(C) the same at every height
(D) below absolute zero

Correct Answer: A

Explanation: In a fractionating column the temperature is hotter at the bottom and cooler at the top.

30. A fractionating column works by providing:

(A) only filter-paper pores
(B) repeated condensation and vaporization before collection
(C) magnetism of each liquid
(D) a complete stop to vapour movement

Correct Answer: B

Explanation: A fractionating column works by providing repeated condensation and vaporization before collection.

31. Steam distillation is useful for volatile, heat-sensitive substances such as:

(A) iron filings only
(B) sand only
(C) essential oils
(D) filter membranes only

Correct Answer: C

Explanation: Steam distillation is useful for volatile, heat-sensitive substances such as essential oils.

32. Vacuum distillation lowers boiling temperatures because:

(A) increased pressure always lowers boiling point
(B) no liquid can boil in a vacuum
(C) pore size of paper changes boiling point
(D) reduced pressure means vapour pressure matches it at a lower temperature

Correct Answer: D

Explanation: Vacuum distillation lowers boiling temperatures because reduced pressure means vapour pressure matches it at a lower temperature.

33. Desalination by distillation works because:

(A) water is vaporized and condensed while salts remain behind
(B) salts condense from vapour first
(C) water is removed with a magnet
(D) both components stay chemically bonded

Correct Answer: A

Explanation: Distillation makes fresh water because water is volatile while dissolved salts are effectively non-volatile.

34. Fractional distillation of crude oil separates fractions according to:

(A) colour only
(B) different boiling ranges
(C) magnetism only
(D) paper pore size only

Correct Answer: B

Explanation: Crude-oil components have different volatilities, so they condense at different heights in a column.

35. An alcohol–water mixture is separated by fractional distillation rather than filtration because both liquids are:

(A) insoluble solids
(B) magnetic
(C) volatile and miscible
(D) separated by decantation alone as pure alcohol

Correct Answer: C

Explanation: Alcohol and water form a homogeneous liquid mixture, so boiling-point differences are used.

36. Distilled water is used in lead-acid batteries because distillation removes:

(A) extra salts on purpose
(B) magnetism
(C) all water
(D) dissolved ions that could interfere with battery chemistry

Correct Answer: D

Explanation: Distilled water is low in dissolved mineral ions, so unwanted deposits and side reactions are reduced.

37. Cryogenic distillation of liquefied air can yield nitrogen, oxygen, and:

(A) argon
(B) only carbon dioxide as the only product
(C) filter paper
(D) sand

Correct Answer: A

Explanation: At very low temperatures air is liquefied, and fractional distillation separates gases with different boiling points.

38. Forms of distillation were already known around:

(A) the twentieth century only
(B) 3000 BC
(C) the invention of HEPA filters
(D) the first electric motor

Correct Answer: B

Explanation: Ancient heating, vapour cooling, and liquid collection show that distillation is a very old practical method.

39. A sand–water mixture is heterogeneous because:

(A) sand is molecularly dissolved
(B) sand is the solvent
(C) its phases are visibly non-uniform and sand can be filtered
(D) it is a true solution

Correct Answer: C

Explanation: Sand does not dissolve in water, so the mixture contains filterable solid particles.

40. Homogeneous brine cannot be cleared of dissolved salt by ordinary filtration because:

(A) salt forms visible sediment always
(B) water is always the solute
(C) paper magnetises salt
(D) dissolved ions pass through ordinary filter paper with the water

Correct Answer: D

Explanation: Brine is a solution whose dissolved particles are too small to be retained as residue.

41. Filtration is a method for a mixture containing:

(A) an undissolved solid in a liquid
(B) only two miscible liquids of similar boiling point
(C) only noble gases
(D) only identical boiling liquids

Correct Answer: A

Explanation: A filter medium retains insoluble solid while liquid passes as filtrate.

42. Gravity filtration uses:

(A) a vacuum pump as the only possible method
(B) the weight of liquid pulling it through folded or conical filter paper
(C) magnetism of water
(D) boiling of the residue

Correct Answer: B

Explanation: Gravity filtration uses the weight of liquid pulling it through folded or conical filter paper.

43. Vacuum filtration speeds separation by using a Buchner funnel and:

(A) no pressure difference
(B) only a magnet
(C) a side-arm flask with reduced pressure
(D) only a thermometer

Correct Answer: C

Explanation: Vacuum below the filter creates a pressure difference that draws liquid through more rapidly.

44. Crystallization purifies a dissolved solid by forming:

(A) magnetic filings only
(B) only gases
(C) unlimited solubility with no solid
(D) ordered crystals from a saturated solution

Correct Answer: D

Explanation: Limited solubility is the principle: excess dissolved material leaves solution as a pure ordered solid.

45. A saturated solution at particle level is one in which undissolved solute is in:

(A) equilibrium with dissolved solute
(B) no contact with solvent
(C) the condenser only
(D) the Bunsen flame only

Correct Answer: A

Explanation: A saturated solution at particle level is one in which undissolved solute is in equilibrium with dissolved solute.

46. The glass-rod cloudiness test shows that crystallization can begin when a drop:

(A) stays perfectly clear on cooling always
(B) turns cloudy as tiny crystals form on cooling
(C) becomes magnetic

(D) measures boiling point

Correct Answer: B

Explanation: Cloudiness appears when cooling lowers solubility enough for tiny crystals to form in the test drop.

47. After a saturated solution is cooled, crystals are removed by:

(A) magnetism only
(B) simple distillation of the crystals
(C) filtration and then drying
(D) adding unlimited extra solvent

Correct Answer: C

Explanation: The solid crystals are filtered from the mother liquor and dried in air or a warm oven.

48. Slow cooling usually forms:

(A) many tiny crystals only
(B) no crystals ever
(C) only gases
(D) larger crystals

Correct Answer: D

Explanation: Slow cooling usually forms larger crystals.

49. Rapid cooling of a crystallising solution usually forms:

(A) a large number of tiny crystals
(B) one giant crystal always
(C) no solid
(D) only a distillate

Correct Answer: A

Explanation: Many nuclei form quickly, so each crystal has little time to grow large.

50. Crystallization can give a purer solid than boiling a solution dry because:

(A) complete evaporation always removes every impurity
(B) soluble impurities can remain in the mother liquor
(C) crystallization cannot purify solids
(D) both methods require magnetism

Correct Answer: B

Explanation: Crystallization can give a purer solid than boiling a solution dry because soluble impurities can remain in the mother liquor.

51. Pure water melts at 0 °C and boils at:

(A) 0 °C also
(B) 100.5 °C as the only pure value
(C) 100 °C
(D) a wide range with no fixed point

Correct Answer: C

Explanation: Fixed melting and boiling points are characteristic of a pure substance such as water.

52. Impure substances typically melt and boil:

(A) at sharper single points than the pure substance
(B) only at 0 °C
(C) only at 100 °C
(D) over a range, often with a slightly lower melting point and higher boiling point

Correct Answer: D

Explanation: Impurities usually broaden the change and shift melting down and boiling up compared with the pure substance.

53. Salt water may boil near 100.5 °C because dissolved impurity:

(A) raises the boiling point slightly

(B) lowers the boiling point
(C) prevents all boiling
(D) turns water into a metal

Correct Answer: A

Explanation: Dissolved salt is an impurity that makes boiling occur a little above 100 °C.

54. Sedimentation followed by decantation means a dense solid settles, then:

(A) the solid is vaporized first
(B) the clearer upper liquid is poured off
(C) a magnet attracts every liquid
(D) the sediment is dissolved on purpose

Correct Answer: B

Explanation: Sedimentation followed by decantation means a dense solid settles, then the clearer upper liquid is poured off.

55. Magnetic separation works when one component is:

(A) dissolved salt in water
(B) separated only by boiling point
(C) attracted strongly to a magnet
(D) every metal equally

Correct Answer: C

Explanation: Iron filings can be pulled from sand because magnetic response differs between the components.

56. Centrifugation speeds separation based mainly on:

(A) boiling only
(B) chemical bonding of the components
(C) always forming crystals
(D) density, by rapid spinning

Correct Answer: D

Explanation: A centrifuge creates a strong outward effect, so denser suspended particles separate more quickly.

57. A Buchner funnel is described as a flat-bottomed porous porcelain bowl used in:

(A) vacuum filtration
(B) simple distillation only
(C) flame tests
(D) chromatography of amino acids only

Correct Answer: A

Explanation: Its stem fits a side-arm flask so reduced pressure can draw filtrate through.

58. Before vacuum filtration, the circular filter paper is wetted to:

(A) dissolve the residue
(B) create a seal on the funnel
(C) magnetise the flask
(D) raise the boiling point

Correct Answer: B

Explanation: A solvent-wetted paper seals to the porcelain so suction pulls liquid through the paper, not around it.

59. Muslin cloth at the mouth of a container can act as a:

(A) fractionating column
(B) condenser
(C) filtration membrane for sand and water
(D) burette

Correct Answer: C

Explanation: Muslin cloth at the mouth of a container can act as a filtration membrane for sand and water.

60. Filter paper is a semi-permeable barrier whose pore size controls:

(A) the SI unit of mass
(B) the colour of distillate
(C) the kelvin temperature of gold
(D) how slowly or quickly filtration occurs

Correct Answer: D

Explanation: Filter paper is a semi-permeable barrier whose pore size controls how slowly or quickly filtration occurs.

61. Coffee-making is a daily example of filtration because:

(A) hot water passes through grounds and a filter while solids are retained
(B) grounds dissolve completely as a true solution
(C) boiling points of coffee and water are used in a column
(D) a magnet pulls caffeine

Correct Answer: A

Explanation: The drink is the filtrate; the retained grounds are the residue.

62. The kidney is described as a biological filter because it:

(A) distils urine in a fractionating column
(B) filters blood and waste materials
(C) magnetises plasma
(D) crystallises only gold

Correct Answer: B

Explanation: Filtration is not limited to school funnels; living kidneys also separate components from a fluid.

63. HEPA units in vacuum cleaners and air conditioners filter:

(A) dissolved NaCl ions from seawater completely
(B) only miscible alcohols
(C) dust and pollen from air
(D) only molten metals

Correct Answer: C

Explanation: Airborne particles are captured while air passes, which is filtration of a gas–solid mixture.

64. Wastewater plants use filtration to:

(A) create crude oil
(B) make every ion into a gas
(C) replace distillation of air
(D) remove suspended material from sewage

Correct Answer: D

Explanation: Large-scale filters separate solids from flowing water during treatment.

65. Alum can be purified from an impure sample by:

(A) crystallization
(B) magnetic separation of aluminium metal only
(C) filtering dissolved alum as residue from water immediately
(D) a flame test only

Correct Answer: A

Explanation: Crystallization is more effective than simple evaporation for removing soluble impurities from alum.

66. Pure salt from seawater is obtained industrially by crystallization rather than crude evaporation when the goal is:

(A) to keep all impurities in the solid
(B) higher purity of the solid salt
(C) to avoid any solid
(D) to use only a magnet

Correct Answer: B

Explanation: Crystal growth can leave soluble impurities in the remaining liquor.

67. Ice cubes and snow are everyday examples of:

(A) filtration of sand
(B) simple distillation of iron
(C) crystallization of water
(D) vacuum filtration of gases only

Correct Answer: C

Explanation: Water molecules arrange into an ordered solid when conditions favour the crystal.

68. Sugar crystals forming as syrup cools illustrate:

(A) magnetic separation
(B) the pop test
(C) limewater turning milky
(D) crystallization

Correct Answer: D

Explanation: Cooling lowers solubility so excess sugar leaves the solution as crystals.

69. Stalactites and stalagmites form by:

(A) crystallization as dissolved minerals deposit
(B) fractional distillation of air
(C) filtration of coffee
(D) the chlorine bleach test

Correct Answer: A

Explanation: Mineral solutions deposit ordered solids as conditions in caves change.

70. To tell whether a school sample is pure, melting point and boiling point are used because they are:

(A) the same for every impure mixture
(B) characteristic parameters of a substance
(C) unrelated to identity
(D) only colours

Correct Answer: B

Explanation: To tell whether a school sample is pure, melting point and boiling point are used because they are characteristic parameters of a substance.

71. Milk chocolate melting more readily than 70% dark chocolate is used to illustrate that:

(A) both are a single pure compound with one melting point
(B) chocolate is an element
(C) composition affects melting behaviour over a range
(D) melting point is independent of purity

Correct Answer: C

Explanation: Milk chocolate melting more readily than 70% dark chocolate is used to illustrate that composition affects melting behaviour over a range.

72. The change of a liquid into its vapour is called:

(A) filtration
(B) magnetic separation
(C) crystallization of a metal
(D) evaporation

Correct Answer: D

Explanation: Evaporation is the phase change used to leave a non-volatile solid behind.

73. Distillation under reduced pressure is also called:

(A) vacuum distillation
(B) gravity filtration
(C) gold panning

(D) a flame test

Correct Answer: A

Explanation: Lower pressure lets substances distil without needing as high a temperature.

74. The principle of crystallization is based on the limited:

(A) magnetism of all salts
(B) solubility of a compound in a solvent at a given temperature and pressure
(C) colour of filter paper
(D) length of a cubit

Correct Answer: B

Explanation: The principle of crystallization is based on the limited solubility of a compound in a solvent at a given temperature and pressure.

75. Enthalpy of vaporization is mentioned as an indicator of:

(A) filter pore size
(B) the colour of residue
(C) the strength of intermolecular forces affecting evaporation
(D) the SI unit candela

Correct Answer: C

Explanation: Stronger attractions mean more energy is needed for molecules to escape as vapour.

76. In an enclosed space, a liquid continues to vaporize until:

(A) the solid dissolves completely always
(B) the magnet is removed
(C) the filtrate disappears
(D) the air above it is saturated

Correct Answer: D

Explanation: Net evaporation slows when the space above the liquid can hold no more vapour.

77. A dye can be recovered from water by evaporation because the dye is:

(A) the less volatile component left behind
(B) more volatile than water always
(C) filtered as a gas
(D) magnetic

Correct Answer: A

Explanation: A dye can be recovered from water by evaporation because the dye is the less volatile component left behind.

78. Essential oils and herbal distillates from flowers are obtained using:

(A) a magnet
(B) steam distillation
(C) ordinary paper filtration of the oil as sand
(D) a stopwatch

Correct Answer: B

Explanation: Essential oils and herbal distillates from flowers are obtained using steam distillation.

79. Perfumes and food flavourings from plants can be extracted by:

(A) only gravity filtration of sand
(B) only a beam balance
(C) distillation methods
(D) only SI prefixes

Correct Answer: C

Explanation: Perfumes and food flavourings from plants can be extracted by distillation methods.

80. A sequenced method is needed when a mixture has:

(A) only one pure element

(B) no physical differences
(C) identical everything
(D) more than two components with different properties

Correct Answer: D

Explanation: Sand and salt, for example, need dissolving, filtering, and then recovering the salt from solution.

B. Less Important / Secondary Topics

81. Belt filters in mining are a large-scale example of:

(A) filtration to extract solids
(B) simple distillation of air
(C) flame tests
(D) scientific notation

Correct Answer: A

Explanation: Moving filter surfaces separate suspended solids from fluids in metallurgical processing.

82. Sand and permeable rock filtering water into an aquifer illustrate:

(A) fractional distillation
(B) natural filtration
(C) the pop test for hydrogen
(D) SI base units

Correct Answer: B

Explanation: Groundwater is cleaned as it passes through porous ground, which is filtration in nature.

83. Automobile and factory air filters remove harmful particles from:

(A) dissolved sugar solutions only
(B) molten NaCl only
(C) smoke and air
(D) pure argon only

Correct Answer: C

Explanation: Automobile and factory air filters remove harmful particles from smoke and air.

84. Aquariums commonly use filters with:

(A) fractionating columns for crude oil
(B) platinum flame-test wire as the filter
(C) burettes as the only filter
(D) particulate-capturing fibres

Correct Answer: D

Explanation: Fibres trap solids while water recirculates, which is everyday filtration.

85. A tea bag is an example of filtration because:

(A) paper lets the drink through and retains the leaves
(B) tea leaves dissolve as a true molecular solution with no solids
(C) boiling points of tea and water differ widely enough for a column
(D) a magnet pulls tannin

Correct Answer: A

Explanation: The bag is a filter membrane; the cup contains the filtrate.

86. Honey forming sugar crystals in a jar is an example of:

(A) vacuum filtration of gases
(B) crystallization
(C) gold panning of iron
(D) the chlorine test

Correct Answer: B

Explanation: Dissolved sugar can leave the viscous mixture as an ordered solid under sui.

87. Dynamic equilibrium in a saturated solution means dissolution and crystallization continue while the net dissolved amount:

(A) rises without limit
(B) becomes zero always
(C) remains constant
(D) turns into a gas always

Correct Answer: C

Explanation: Forward and reverse particle processes balance, so concentration stays constant at that temperature.

88. Heating during crystallization is used until enough solvent has evaporated to make the solution:

(A) unsaturated forever
(B) a gas mixture for cryogenic distillation
(C) magnetic
(D) saturated

Correct Answer: D

Explanation: A hot concentrated solution is brought to saturation so cooling will then deposit crystals.

89. The remaining liquid after crystals are filtered off is often called the:

(A) mother liquor
(B) distillate of crude oil
(C) SI prefix
(D) meniscus of a burette only

Correct Answer: A

Explanation: Soluble impurities tend to stay in that leftover solution, which is why crystallization purifies.

90. A Hirsch funnel is mentioned alongside a Buchner funnel as equipment for:

(A) flame tests
(B) filtration
(C) measuring time to 0.01 s
(D) naming binary compounds

Correct Answer: B

Explanation: Both are specialised funnels used when a solid is separated from a liquid under suction or related laboratory filtration.

91. Hot or cold filtration can be chosen depending on whether the goal is:

(A) changing atomic number
(B) measuring candela
(C) isolating a solid or removing impurities under suitable temperature
(D) writing scientific notation

Correct Answer: C

Explanation: Temperature affects solubility, so chemists pick conditions that keep the desired solid or keep impurities dissolved.

92. A simple glass funnel with folded paper is typical of:

(A) cryogenic distillation of argon
(B) a gas syringe
(C) an analytical balance
(D) gravity filtration

Correct Answer: D

Explanation: A simple glass funnel with folded paper is typical of gravity filtration.

93. Relative volatility being higher makes distillation:

(A) more effective
(B) impossible
(C) independent of boiling point

(D) the same as magnetism

Correct Answer: A

Explanation: Relative volatility being higher makes distillation more effective.

94. The less volatile component in a simple distillation remains mainly in the:

(A) condenser as the first distillate
(B) round-bottom flask
(C) filter paper residue of sand
(D) gas syringe

Correct Answer: B

Explanation: The higher-boiling substance does not vaporize as readily, so it is left behind.

95. A thermometer in a distillation flask is used to:

(A) measure mass of residue
(B) filter the mixture
(C) monitor the temperature of the vapour being collected
(D) magnetise alcohol

Correct Answer: C

Explanation: Collection temperature helps identify which fraction is distilling.

96. Cooling water around a condenser causes vapour to:

(A) increase in temperature continuously
(B) turn into a magnetic solid
(C) pass unchanged into the air always
(D) decrease in temperature and return to liquid

Correct Answer: D

Explanation: Heat is removed so the gas becomes liquid distillate.

97. Distilled water is also mentioned for low-volume humidifiers because it is:

(A) low in dissolved minerals compared with tap water
(B) rich in dissolved ions
(C) a saturated salt solution
(D) identical to seawater

Correct Answer: A

Explanation: Distilled water is also mentioned for low-volume humidifiers because it is low in dissolved minerals compared with tap water.

98. Chemical-synthesis plants use distillation on a large scale to:

(A) filter only sand from tea
(B) purify liquid products
(C) measure stopwatch precision
(D) perform flame tests

Correct Answer: B

Explanation: Volatility differences scale from school glassware to industrial columns.

99. Two possible ways to separate sand from water are filtration and:

(A) the pop test
(B) a flame test for sodium
(C) sedimentation and decantation
(D) scientific notation

Correct Answer: C

Explanation: Sand can settle and the water can be poured off, or the mixture can be filtered.

100. A mixture of two solids such as sand and iron filings is separated with a:

(A) fractionating column
(B) limewater test

(C) burette
(D) magnet

Correct Answer: D

Explanation: Iron is magnetic and sand is not, so a magnet pulls one component away.

101. Alcohol is separated from water using:

(A) fractional distillation
(B) ordinary filtration of alcohol as residue
(C) a magnet
(D) decantation of two layers that always form

Correct Answer: A

Explanation: The liquids are miscible, so a column exploiting boiling-point difference is required.

102. Oil and water are immiscible, so a suitable method is:

(A) a separating funnel
(B) ordinary paper filtration of dissolved oil ions
(C) a flame test
(D) scientific notation

Correct Answer: B

Explanation: Layers form by density difference; the denser liquid can be run off through the tap.

103. Filtration fails to desalinate seawater because dissolved ions:

(A) are larger than sand grains
(B) are magnetic
(C) pass through ordinary filter paper
(D) become distillate automatically

Correct Answer: C

Explanation: A true solution is homogeneous; particle size is too small for ordinary pores.

104. Brine is given as an example of a solution in which salt is the:

(A) solvent in larger amount
(B) filter paper
(C) condenser
(D) solute in smaller amount

Correct Answer: D

Explanation: Water is the solvent present in greater amount and salt is the dissolved solute.

105. A crystal is described as a pure substance whose particles form a:

(A) well-defined three-dimensional structure
(B) random gas only
(C) meniscus only
(D) mobile chromatographic phase

Correct Answer: A

Explanation: Fixed angles and an ordered lattice are why crystallization is used for purification.

106. Changing temperature or pressure to a state of lower solubility leads to:

(A) unlimited dissolving
(B) formation of a crystalline solid
(C) always a gas
(D) always a filtrate of sand

Correct Answer: B

Explanation: The crystallization principle is to push the system beyond the solubility limit.

107. In metallurgy, filtration can be used to remove:

(A) argon from air by boiling only
(B) the need for any physical property difference

(C) slag
(D) SI units

Correct Answer: C

Explanation: Solid slag can be separated from a fluid process stream by a filter.

108. Why separate mixtures at all? The chapter lists obtaining valuable components, identifying properties, and producing useful substances such as:

(A) only cubits
(B) only body-based units
(C) only watermarks
(D) medicines

Correct Answer: D

Explanation: Purification is practical: it isolates materials people need and helps identify what is present.