

Section A: Multiple Choice (1 Mark Each)

1. Which of the following is the best definition of a colloid?

- A) A transparent liquid with dissolved solids.
- B) A mixture where small particles are dispersed but do not sink.
- C) A mixture where large particles sink to the bottom over time.
- D) Two substances that are chemically joined together.

2. Why is a pencil used to draw the starting line in chromatography instead of a pen?

- A) Pencil lead is more colorful.
- B) Pen ink is permanent and cannot be removed.
- C) Pen ink would dissolve in the solvent and interfere with the results.
- D) Graphite conducts electricity.

3. If you dissolve 40g of salt into 200g of water, what is the total mass of the solution?

- A) 160g
- B) 200g
- C) 240g
- D) 400g

4. Which process is used to separate a soluble solid from a liquid to keep the liquid?

- A) Filtration
- B) Evaporation
- C) Chromatography
- D) Distillation

5. Which type of mixture is always transparent (see-through)?

- A) Suspension
- B) Colloid
- C) Solution
- D) Emulsion

Section B: Short Answer (2 Marks Each)

6. Define "Solubility" and explain how temperature affects it for most solids.

7. Look at the diagram of a Liebig Condenser. Explain why the "water in" tube is at the bottom and the "water out" is at the top.

8. Name two safety hazards when performing a distillation experiment in a lab.

Section C: Data & Analysis (3 Marks Each)

9. A student performs chromatography on a purple dye. The results show one blue spot and one red spot.

- a) Is the purple dye a pure substance? (1 mark) _____
- b) Explain your answer. (2 marks)

10. You are given a mixture of sand, salt, and water. Describe the steps you would take to get pure, dry salt.

Section D: Essay / Long Answer (3 Marks)

11. Explain the water treatment process. How do we turn "dirty" river water into safe drinking water? Mention at least three specific steps (e.g., filtration, chlorination).

12. The "Suck-back" Hazard (2 Marks)

In your distillation experiment (Page 60), you learned about "suck-back."

- a) What is suck-back?

- b) How can it be prevented?

13. Interpreting Chromatography (2 Marks)

Look at the results for the **Green Dye** on Page 58. The results show a yellow spot and a blue spot.

- Which of these two colors is **more soluble** in the solvent?

- Explain how you know:

14. Solutions & Solutes (3 Marks)

A student is using **propanone** (nail polish remover) to clean a spill.

- a) Is nail polish **soluble** or **insoluble** in water?

- b) In the mixture of propanone and nail polish, which one is the **solvent**?

- c) Why can't we use water to remove nail polish?

15. Concentration Analysis (3 Marks)

You have a solution of blue copper sulfate.

- The solubility is **32g per 100g of water** at 20°C .
- If you have **300g of water**, what is the maximum mass of copper sulfate that will dissolve? (Show your working).

Choose the correct answer:

Which of the following statements about the water treatment process is NOT correct?

Water is boiled to remove insoluble solids before filtration.

Chemicals are added to clump very small particles together.

Large solids are removed from wastewater using sieves.

Water is left to stand so that heavier particles settle at the bottom.

Which statement explains why suspensions settle but colloids do not?

Suspension particles are larger and heavier

Colloids are always liquids

Colloids contain dissolved particles

Suspensions scatter light

Look at the diagram on the right. What is the liquid that runs through the filter paper called?



Filtrate

Filter Paper

Filter Funnel

Filtration

A mixture:

- does not settle
- cannot be filtered
- scatters light

Which conclusion is most scientifically accurate?

- It is a colloid
- It is a pure substance
- It is a suspension because it contains solids
- It is a solution

Which of the following is the term used to describe a mixture where solid particles disperse in the liquid and do not settle at the bottom?

- Solution
- Emulsion
- Colloid

Which step in water treatment separates colloids?

- Settlement after adding special chemicals
- Chlorination after adding the special chemicals
- Sieving to separate the solvent and the solute.
- Evaporation to separate the solvent and the solute

1. Does evaporation happen at any temperature?*

- a. Yes
- b. No

b. Mined from rocks underground

- c. All of the above

d. None of the above

3. What is the name of the substance of the salt we eat?*

- a. Sodium Chloride
- b. Magnesium Chloride
- c. Sodium Bicarbonate
- d. Potassium Chloria

4. When we have a salt solution it is called?*

- a. Salt solution
- b. Salt and water
- c. Brine
- d. Aqueous solution

5. Does temperature affect the rate of evaporation?*

- a. Yes
- b. No

If you stir a spoonful of sugar into a glass of water until the sugar is no longer visible, what is the scientific name for the sugar in this scenario?

- A.Solvent
- B.Saturated solution
- C.Suspension
- D.Solute

Which of the following is a defining physical characteristic of all solutions?

- A.They always turn blue.
- B.They are transparent.
- C.They are always opaque.
- D.They must contain a gas.

If sand is added to water and it does not dissolve regardless of how much you stir, how would you describe the sand in relation to water?

- A.Solvent
- B.Concentrated
- C.Insoluble
- D.Soluble

In the process of making a solution of copper sulfate and water, which part is the 'solvent'?

- A.The stirring rod.
- B.The water.
- C.The copper sulfate crystals.
- D.The blue color.

If you continue adding salt to a beaker of water and it eventually stops dissolving and sinks to the bottom, the solution is now:

- A.Unsaturated
- B.Insoluble
- C.Transparent
- D.Saturated