# Chromatography Experiment – Organized MCQs

1. Which statement BEST explains why chromatography is considered both a separation and identification technique?

A. Because it measures only the mass of compounds

B. Because separation inherently reveals molecular weight

C. Because physical migration reflects interaction properties unique to each compound

D. Because all compounds move differently regardless of conditions

2. In TLC, if two compounds have identical Rf values under the same conditions, the MOST logical conclusion is:

A. They are definitely the same compound

B. They have identical polarity and interactions in that system

C. They have identical molecular structures

D. They cannot be separated under any conditions

3. The paradox of adsorption chromatography is that stronger interaction leads to slower movement. This implies:

A. Mobility is inversely proportional to affinity

B. Mobility is directly proportional to adsorption strength

C. All compounds move equally eventually

D. Solvent polarity has no effect

4. Why is silica gel commonly used as a stationary phase in TLC?

A. It is non-polar and inert

B. It has adjustable polarity depending on temperature

C. It provides strong polar adsorption sites

D. It reacts chemically with all compounds

5. According to the experiment, increasing eluent polarity results in:

A. Lower Rf values

B. No change in Rf

C. Higher Rf values due to stronger desorption

D. Complete loss of separation

6. The philosophical implication of Rf value being “less than 1” is that:

A. Compounds cannot exceed solvent mobility

B. Solvent is always faster than compounds

C. Compounds are chemically bound to solvent

D. Stationary phase does not affect motion

7. Why is it recommended to keep Rf values between 0.2–0.8?

A. Because values outside this range are chemically impossible

B. Because extreme values reduce resolution and analytical meaning

C. Because solvent cannot travel further

D. Because compounds degrade outside this range

8. If a compound barely moves from the origin, this suggests:

A. It is non-polar

B. It is highly soluble in mobile phase

C. It is strongly adsorbed on stationary phase

D. It has low molecular weight

9. Why must the solvent front be marked immediately after development?

A. To prevent evaporation of compounds

B. Because Rf calculation depends on a disappearing reference point

C. Because compounds degrade quickly

D. Because the plate changes color

10. The concept of “tailing” in TLC reflects:

A. Perfect separation

B. Overloading and diffusion of sample

C. High polarity of solvent

D. Strong adsorption only

11. In the experiment, o-nitroaniline had a higher Rf than p-nitroaniline. This implies that o-isomer is:

A. More polar

B. Less strongly adsorbed

C. Chemically identical

D. Larger in size

12. Why do mixtures produce multiple spots while pure compounds produce one?

A. Because mixtures react chemically

B. Because each component has distinct interaction behavior

C. Because solvent separates by size only

D. Because impurities move randomly

13. Capillary action in TLC can be philosophically interpreted as:

A. External force dominating movement

B. Passive diffusion only

C. Balance between adhesive and cohesive forces

D. Chemical reaction driving motion

14. Why are colorless compounds visualized using UV or iodine?

A. Because they absorb visible light strongly

B. Because they form detectable interactions or fluorescence

C. Because they become colored naturally

D. Because solvent reacts with them

15. In paper chromatography of dyes, separation into concentric circles implies:

A. Different boiling points

B. Different partition coefficients

C. Chemical reactions occurred

D. Identical polarity

16. Why is the developing chamber saturated with solvent vapor?

A. To increase evaporation

B. To maintain equilibrium and uniform movement

C. To reduce polarity

D. To stop separation

17. The role of solvent choice is BEST described as:

A. Passive carrier only

B. Active competitor for adsorption sites

C. Irrelevant to separation

D. Only determines color

18. If two spots overlap completely, the BEST interpretation is:

A. Poor spotting technique or similar interactions

B. Compounds are identical always

C. Solvent is too polar

D. Plate is defective

19. The concept of chromatography fundamentally represents:

A. Chemical transformation

B. Physical equilibrium between phases

C. Only diffusion

D. Only adsorption

20. In dye experiment, the blue dye had higher Rf. This suggests that the blue dye is:

A. More polar

B. Less soluble in mobile phase

C. Less strongly adsorbed and more soluble

D. Chemically unstable

# Model Answers

1. C
2. B
3. A
4. C
5. C
6. A
7. B
8. C
9. B
10. B
11. B
12. B
13. C
14. B
15. B
16. B
17. B
18. A
19. B
20. C