

Amines, amino acids and condensation polymers in action

Chemistry grades 11-12 (A Level · IB · Class 11-12) · Lab answers

These model answers use the sample results from the lab. Your own Rf values will vary slightly with temperature and solvent mix, so compare patterns and ordering as well as the numbers.

Level: Chemistry grades 11-12 (A Level · IB · Class 11-12) · **Curriculum:** A Level 3.3.11-3.3.13

Question 1 Calculate Rf for X

$R_f = 4.6 \div 12.0 = 0.383$ and $8.8 \div 12.0 = 0.733$. Results: **0.38 and 0.73**.

Question 2 Identify X

The values match alanine (0.38) and leucine (0.73), and the spots lie level with the known samples. X contains **alanine and leucine**.

Question 3 Pencil and ninhydrin

Pencil graphite is insoluble and does not move with the solvent; ink would dissolve and run. Amino acids are colourless, and **ninhydrin reacts with them to give purple spots** that can be seen.

Question 4 Solvent level

If the baseline were under the solvent, the samples would dissolve into the tank and **could not be separated** as they travel up the paper.

Question 5 Why Rf varies

Rf depends on **temperature** and **solvent composition** (also paper type). Running known samples on the same sheet at the same time reduces the effect.

Question 6 A close pair

$R_f = 3.3 \div 12.0 = 0.28$. This differs from glycine (0.26) by only 0.02, so the two spots **could easily be confused**.

Question 7 Improve the lab

Run a second solvent and compare Rf values, or use two-way chromatography; repeat the

run and average the distances; use a larger paper so spots separate further. **A second solvent system** is the most useful.