

F324: Rings, Polymers & Analysis

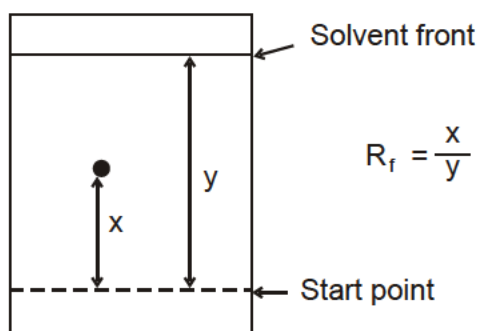
4.3.1 – Chromatography MARK SCHEME

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|----|------------------|--|---|-----|
| 1. | (i) adsorption ✓ | <p><i>ALLOW partition OR adsorbition</i>
 <i>IGNORE solubility OR desorption</i>
 <i>DO NOT ALLOW absorption</i></p> | 1 | |
| | (ii) | <p>measure how far each spot travels relative to the solvent front or calculate the R_f value ✓</p> <p>compare R_f values to those for known amino acids ✓</p> <p><i>ALLOW compare R_f values to database</i>
 <i>ALLOW compare to known amino acids</i>
 <i>DO NOT ALLOW retention times for first mark, but the 2nd mark would be available as ✓ ECF</i>
 <i>ALLOW alternative approach: on the same plate compare position of spots ✓ with known amino acids ✓</i></p> | 2 | |
| | (iii) | <p>(amino acids won't separate because) similar compounds have similar R_f (values) ✓</p> <p><i>ALLOW spots often overlap OR don't (fully) separate</i>
 <i>ALLOW they have similar R_f (values) or similar adsorptions or similar retention times ECF to (ii)</i></p> | 1 | [4] |
| 2. | (i) | <p>one amide link shown correctly (1)
 glycine and phenylalanine parts shown correctly (1)
 proline linked correctly (1)</p> | 3 | |
| | (ii) | 6 (1) | 1 | |
| | (iii) | <p>gas/liquid chromatograph separates the tripeptides (1)
 mass spectrometer produces a distinctive fragmentation pattern (1)
 identification by computer using a spectral database (1)</p> | 3 | [7] |
| 3. | (a) | <p>R_f value is distance moved by a component/spot/solute divided by distance moved by solvent. (1)</p> <p>Retention time is the time between injection and emergence (or detection) of a component. (1)</p> | 2 | |

- (b) (i) Partition / adsorption (1) 1
- (ii) Role of gas: carrier gas / mobile phase / to carry to sample through the chromatography column (1)
- Role of liquid: stationary phase (1) 2
- (iii) Trace with two peaks drawn (1) 1
- (iv) Measure **area** under each peak (1)
- Find total area (1)
- $\% = (\text{area of one peak} / \text{total area}) \times 100\%$ (1) 3

[9]

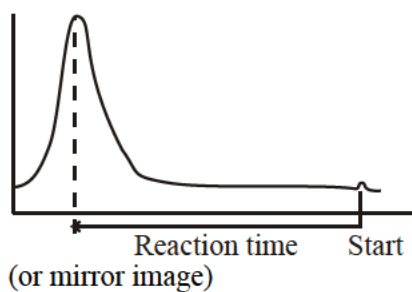
4. (i) Accept paper, column or thin-layer chromatography 1
- (ii) The R_f value 1
- (iii)



1

[3]

5. (a) (i) Retention time 1
- (ii)



1

- (b) Partition 1

[3]