

Question number	Answer	Marks	Guidance
1 (a)	<p><b>Wear plastic gloves:</b> Essential – to prevent contamination from the hands to the plate</p> <p><b>Add developing solvent to a depth of not more than 1#cm<sup>3</sup>:</b> Essential – if the solvent is too deep it will dissolve the mixture from the plate</p> <p><b>Allow the solvent to rise up the plate to the top:</b> Not essential – the R<sub>f</sub> value can be calculated if the solvent front does not reach the top of the plate</p> <p><b>Allow the plate to dry in a fume cupboard:</b> Essential – the solvent is toxic</p>	1  1  1  1	Allow hazardous
1 (b)	<p>Spray with developing agent or use UV</p> <p>Measure distances from initial pencil line to the spots (x)</p> <p>Measure distance from initial pencil line to solvent front line (y)</p> <p><math>R_f \text{ value} = x / y</math></p>	1  1  1  1	
1 (c)	<p>Amino acids have different polarities</p> <p>Therefore, have different retention on the stationary phase or different solubility in the developing solvent</p>	1  1	
2 (a)	<p>The R<sub>f</sub> values are:</p> <p>Spot 1: <math>\frac{0.9}{5.5} = 0.16</math> arginine</p> <p>Spot 2: <math>\frac{2.2}{5.5} = 0.40</math> alanine</p> <p>Spot 3: <math>\frac{4.0}{5.5} = 0.73</math> arginine</p>	1	
2 (b)	R <sub>f</sub> values differ in different solvents	1	
3 (a)	<p>A spot of the mixture to be separated is placed in the corner of a square of chromatography paper, about 1 cm from each edge.</p> <p>The plate is placed in a chromatography tank containing solvent 1 to a depth of less than 1 cm.</p>	1  1	

	The solvent is allowed to run up the plate and when it nearly reaches the top, the position of the solvent (the solvent front) is marked and the position of any separated spots identified (by using UV light or a chemical which produces a colour change) and marked.	1	
	The plate is then rotated through 90° so that the separated spots are now along the bottom of the plate and the procedure repeated with solvent 2.	1	
3 (b)	Each component has two R <sub>f</sub> values both of which must match with a known component.	1	
3 (c) (i)	$\frac{23}{44} = 0.52$	1	
3 (c) (ii)	$\frac{22}{44} = 0.50$	1	
4	oxidation (of alcohol by oxygen in air)	1	Must refer to the spectrum
	absorption at 1680–1750 (due to C=O)	1	
	comparison of polarity of molecules or correct imf statement: propanone is less polar <b>OR</b> propan-2-ol is more polar <b>OR</b> propanone has dipole-dipole forces <b>OR</b> propan-2-ol has hydrogen bonding	1	
	about attraction to stationary phase or solubility in moving phase Propan-2-ol has greater affinity for stationary phase or vice versa <b>OR</b> propanone is more soluble in solvent/moving phase or vice versa	1	