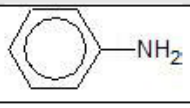
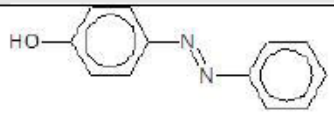
Organic Nitrogen Compounds - Mark Scheme

Q1.

Question number	Answer	Mark
	A $C_6H_5–NH_2 < H–NH_2 < CH_3–NH_2$	1

Q2.

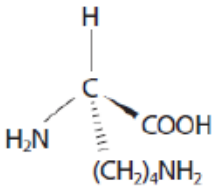
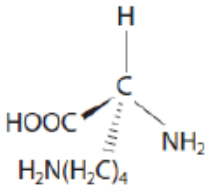
Question number	Answer	Mark
(a)	A HNO_2 	1

Question number	Answer	Mark
(b)	B 	1

Q3.

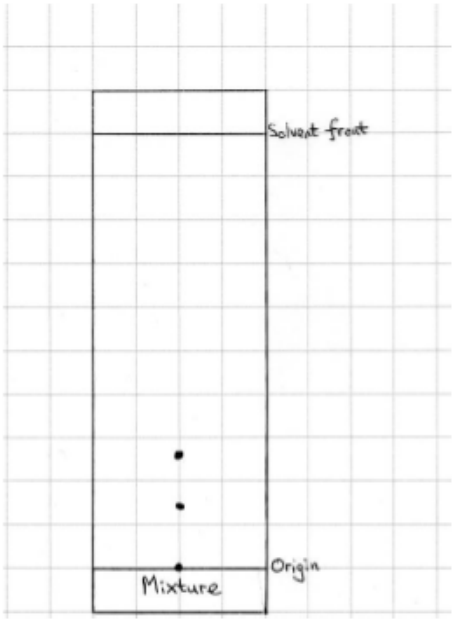
Question number	Answer	Additional guidance	Mark
(a)	A suitable equation such as: • $NH_2CH_2COOH + NaOH \rightarrow NH_2CH_2COO^{(-)}Na^{(+)} + H_2O$	Allow zwitterion ionic equation displayed formulae Ignore state symbols even if incorrect Do not award O-Na	1

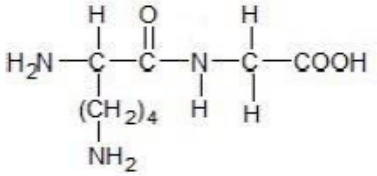
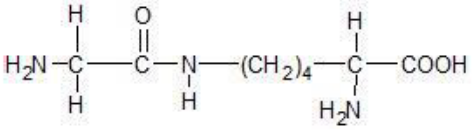
Question number	Answer	Additional guidance	Marks
(b)	• number of moles of lysine **and** number of moles of HCl (1) • volume of HCl in cm^3 (1)	Example of calculation: n(1.825 ÷ 146=) 0.0125 (mol) n(0.0125 × 2=) 0.025 (mol) V = (0.025 ÷ 0.100) × 1000 = 250 cm^3 Allow answer in dm^3 Allow 1 mark for 125 cm^3	2

Question number	Answer	Additional guidance	Marks
(c)(i)	 (1)  (1)	Structures must be 3-dimensional Allow any orientation	2

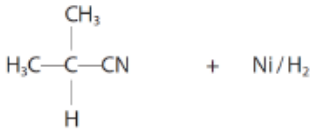
Question number	Answer	Additional guidance	Marks
(c)(ii)	A description which includes: • the plane of plane-polarised (monochromatic) light (1) • will be rotated equally but in opposite directions by the two enantiomers/left by one (laevo-rotatory) enantiomer and to the right by the other (dextro-rotatory) enantiomer. (1)	Allow omission of one plane Allow use of d and l/(+) and (−) Do not award use of D and L	2

Question number	Answer	Additional guidance	Marks
(c)(iii)	• glycine does not have a chiral carbon/centre or asymmetric carbon or is superimposable on its mirror image		1

Question number	Answer	Additional guidance	Marks
(d)	A suitable diagram such as:  	Allow spots of any reasonable size and anywhere within the range for lysine 0.1-0.2 and for glycine 0.2-0.3	1

Question number	Answer	Additional guidance	Marks
(e)	A diagram such as: • 	Allow: 	1

Q4.

Question number	Answer	Mark
	 A	1

Q5.

Question number	Answer	Mark
	C $CH_3COCl + NH_3 \rightarrow CH_3CONH_2 + HCl$	1