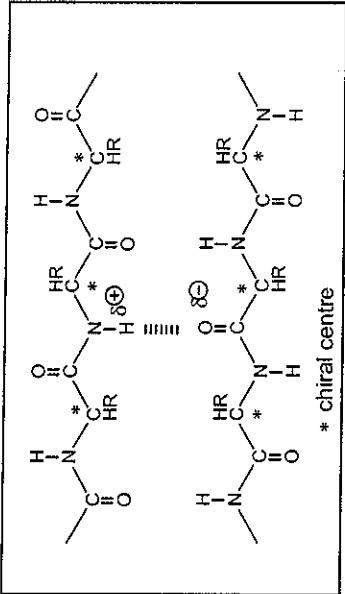


# Mark Scheme 2849 June 2005

Question	Expected answers	Marks
5 (a) (i)	 <p>Bond correct (1) partial charges correct (1) Mark any one chiral atom correct (see above) no mark awarded if a wrong atom is also marked (1); C atom is asymmetrical/bonded to four different atoms/groups (1). (<math>\alpha</math>-)helix (1); (<math>\beta</math>-) pleated/sheet (1). Any two marking points from the following: Covalent/disulphide bridges/bonds (1); ionic (1); instantaneous dipole-induced dipole forces (1); permanent dipole-permanent dipole forces / permanent dipole-induced dipole forces (1).</p>	2
5 (a) (ii)	<p>Bond correct (1) partial charges correct (1). Mark any one chiral atom correct (see above) no mark awarded if a wrong atom is also marked (1); C atom is asymmetrical/bonded to four different atoms/groups (1).</p>	2
5 (a) (iii)	<p>(<math>\alpha</math>-)helix (1); (<math>\beta</math>-) pleated/sheet (1).</p>	2
5 (b)	<p>Any two marking points from the following: Covalent/disulphide bridges/bonds (1); ionic (1); instantaneous dipole-induced dipole forces (1); permanent dipole-permanent dipole forces / permanent dipole-induced dipole forces (1).</p>	2
5 (c) (i)	<p>One mark each for points in bold and then any three others up to a total of 5 marks for both parts: Allow cross marking of points.</p>	5
5 (c) (ii)	<p><b>Enzyme used to cut required gene (1);</b> from DNA of organism (1); plasmids/rings of DNA extracted from bacterial cells (1); enzyme used to cut plasmids (1);</p> <p><b>c(ii)</b> <b>new gene spliced in using other enzymes (1);</b> modified plasmids replaced in bacterial cells (1); cells multiply in fermenter/ cultured (1); new gene causes synthesis of the required protein (1). Moderately concentrated acid/ HCl(aq) (1). Do not allow dilute acid or sulphuric acid.</p>	1
5 (d) (i)	<p>Reaction mixture is boiled and vapours are cooled AW (EVAP &amp; COND mark) (1) sealed top is a CON; liquid is returned to mixture / no loss of reactants or products AW (1).</p>	2
5 (e)	<p>Type of H atoms present AW (1); (relative) numbers of each type (1).</p>	2
<b>Total mark</b>		<b>18</b>

Question	Expected answers	Marks								
3 (f) (i)	<table border="1"> <thead> <tr> <th>reactant</th> <th>order</th> </tr> </thead> <tbody> <tr> <td>bromide ion, Br<sup>-</sup></td> <td>1</td> </tr> <tr> <td>bromate ion, BrO<sub>3</sub><sup>-</sup></td> <td>1</td> </tr> <tr> <td>acid, H<sup>+</sup></td> <td>2</td> </tr> </tbody> </table> <p>1 mark for each order correct (3). Rate = <math>k \times [\text{Br}(\text{aq})] \times [\text{BrO}_3(\text{aq})] \times [\text{H}^+(\text{aq})]^2</math> (1) ignore state symbols and note any ecf from f(i). mol<sup>3</sup> dm<sup>9</sup> s<sup>-1</sup> ecf (1).</p>	reactant	order	bromide ion, Br <sup>-</sup>	1	bromate ion, BrO <sub>3</sub> <sup>-</sup>	1	acid, H <sup>+</sup>	2	3
reactant	order									
bromide ion, Br <sup>-</sup>	1									
bromate ion, BrO <sub>3</sub> <sup>-</sup>	1									
acid, H <sup>+</sup>	2									
3 (f) (ii)		2								
<b>Total mark</b>		<b>23</b>								

1 (c)	<table border="1"> <thead> <tr> <th>chemical shift</th> <th>type of proton</th> </tr> </thead> <tbody> <tr> <td>2.1</td> <td></td> </tr> <tr> <td>11.4</td> <td></td> </tr> </tbody> </table> <p>1 mark each for type of proton (2);</p>	chemical shift	type of proton	2.1		11.4		3
chemical shift	type of proton							
2.1								
11.4								
1 (d)	<p>(1). One mark each for points in bold and then any three others up to a total of 6 marks:</p> <p>Pencil line near bottom; of plate; dissolve acetanilide in ethanol; spot sample of mixture on line; <b>solvent in beaker below sample not ethanol;</b> <b>cover beaker (with lid/film);</b> leave until solvent front nears top of plate; remove and dry plate; <b>(UV light or iodine) to locate (use of locating agent);</b> use of a standard compound to identify acetanilide/ R<sub>f</sub> values the same / spots the same height.</p> <p>QWC Award the mark if there is only one error in spelling, punctuation or grammar in <b>any two relevant sentences.</b></p>	6						
1 (e)	<p>2 marking points from</p> <p>Synthesis (1); modification of structure/change properties e.g. solubility (make more effective e.g. increase time when effective (1)); analysis/identification(1) checking purity (1) scaling-up processes (1) formulation of preparation e.g. tablets, solution, spray etc. (1). Do NOT allow testing alone or testing for safety etc. or on animals.</p>	2						
<b>Total mark</b>		<b>23</b>						