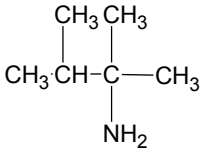
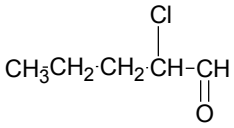
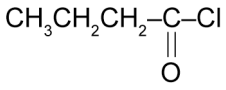
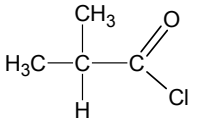
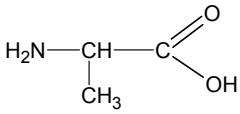
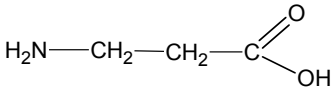
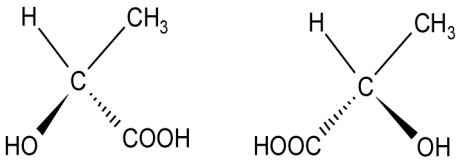
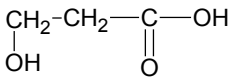
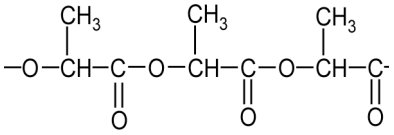
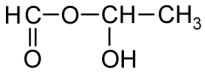
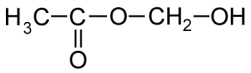
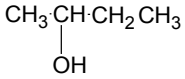
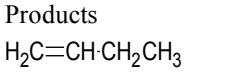
Assessment Schedule – 2007

Chemistry: Describe aspects of organic chemistry (90698)

Evidence Statement

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	(i) 4-methylpentan-2-one (ii) propanamide / propylamide (iii) ethyl methanoate (iv) 3-methylpentanal	THREE out of four correct.		
(b) (i)		THREE out of four correct.	All structures with correct chain length and functional groups.	
(ii)				
(iii)	 OR 			
(iv)	 OR 			
TWO (a)		ONE isomer drawn correctly with 3-dimensional (3D) arrangement of groups around chiral carbon **OR** The isomers are exact mirror images of a 3D structure that has a minor error in the formula, or an error in the way the groups are connected to the chiral C atom.	BOTH isomers correctly drawn showing 3D arrangement around chiral C, **AND** correct mirror images.	
(b) (i), (ii)	 Compound does not have a chiral carbon - a C with 4 different groups attached.	Correct structure **OR** Full explanation of why structure cannot exist as enantiomers.	Correct explanation to justify correct structure.	

(c)		Correct structure but with minor error(s) at end(s) **OR** incorrect number of repeating units.	Correct structure.	
(d)	 Ester group does not have acidic properties. –OH must be on secondary carbon to be oxidised to ketone rather than carboxylic acid OR Alternative structure that includes an ester group and a primary alcohol group that is only oxidised to an aldehyde group rather than the carboxylic acid eg: 	Valid structure showing correct number of atoms of each type and no carboxylic acid group **OR** Discussion linking lower boiling point to structure and weaker intermolecular attractions **and** lack of acidity due to no carboxylic acid group.	Correct structure. **OR** Isomeric structure that does not have a carboxylic acid group eg ester plus **primary** alcohol group and explanation links structure to lack of acidity of cpd Z or link between lower boiling point and expected weaker intermolecular forces.	Correct explanation to justify structure of Z and its oxidation product being non-acidic.
THREE (a)	Substitution Reagent NaOH (aq)/ NaOH/ OH^- / KOH Product  Elimination Reagent NaOH (alc), KOH(alc) Ethanolic KOH Products  **OR** *cis*-but-2-ene and *trans*-but-2-ene	THREE species correct.	Reaction scheme correctly completed.	
(b)(i)	Joining of molecules with the removal of a small molecule, eg water .	Correct.		
(b)(ii)	With heat, products are $CH_3CH_2NHCOCH_3 + H_2O$ OR $CH_3CONHCH_2CH_3 + H_2O$ At room temperature, products are $CH_3CH_2NH_3^+ + CH_3COO^-$	Organic product(s) correct for ONE reaction.	Products correct for both reactions but one minor error eg H_2O not included in eqn 1 or one charge missing from ions in eqn 2.	Products correct.
(b) (iii)	Amide.	Correct name.		
(b)(iv)	Aminoethane is basic so a water solution will turn red litmus blue. The amide will not change the colour of litmus (or colours with Universal Indicator). **OR** Cu^{2+} ion reacts with aminoethane reacts to form a complex ion that is dark blue, no reaction with the amide. **OR** A sample of aminoethane held adjacent to a sample of conc HCl will produce a white cloud/smoke as the alkylammonium chloride forms; no formation of a white smoke in case of the amide with conc HCl.	Correct test identified.	Correct test and correct observations with BOTH substances.	

FOUR (a)(i) (ii)	$SOCl_2$ / PCl_3 / PCl_5 NOT HCl $CH_3CH_2CH(NH_2)CH_3$ Accept recognition that substitution will not occur under these conditions alone.	EITHER answer (i) or (ii) correct.		
(iii) (iv)	Reagent 1 $Cr_2O_7^{2-}$ / H^+ or MnO_4^- / H^+ Product CH_3COOH Reagent 2 NaOH, Na_2CO_3, $NaHCO_3$ Reagent 1 <u>conc</u> H_2SO_4 Product $CH_3CH=CH_2$ Reagent 2 Dilute H_2SO_4 or H^+ / H_2O	The product and ONE reagent correct for (iii) **OR** (iv)	The product and ONE reagent correct for both schemes.	BOTH schemes correct.
(b)	1. Add bromine water • Violent reaction – acid chloride. • Decolourises instantly – hex-1-ene. • The hex-1-ene is insoluble and forms 2 layers. 2. Add $Cr_2O_7^{2-}$ / H^+ if substance soluble. • Ethanol will change the dichromate from orange to green. • Methyl propanol will not react.	Could identify TWO out of four with relevant observations.	Could identify THREE out of four. Must include relevant observations.	Scheme complete including all relevant observations.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
EIGHT opportunities answered at Achievement level (or better). Minimum of 8 × A	NINE opportunities answered including at least SIX at Merit level (or better) and THREE at Achievement level (or better). Minimum 6 × M + 3 × A	TEN opportunities answered including at least TWO at Excellence level plus SIX at Merit level (or better) and TWO at Achievement level (or better). Minimum 2 × E + 6 × M + 2 × A