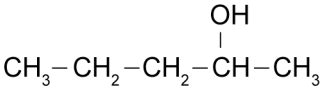
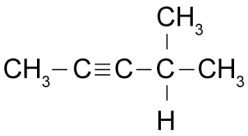
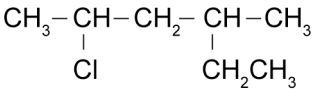
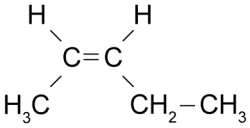
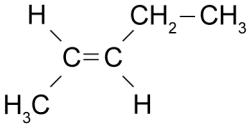
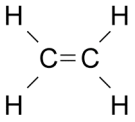
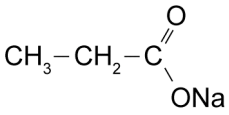
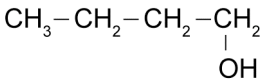
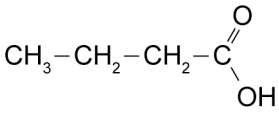
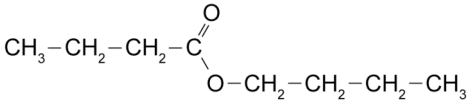
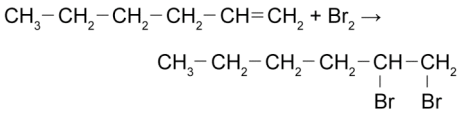
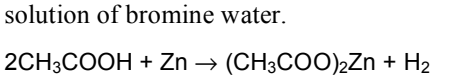
Assessment Schedule – 2008

Chemistry: Describe the structural formulae and reactions of compounds containing selected organic functional groups (90309)

Evidence Statement

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE	A:  B: 1,2-dichlorobutane C:  D: ethylbutanoate	THREE correct answers.		
TWO (a) (b) (c)	 The longest chain contains 6 C atoms not 5. 2-chloro-4-methylhexane	Implied structure drawn correctly OR explanation correct OR corrected name.	ANY TWO OF: • implied structure drawn correctly • explanation correct • corrected name.	ALL OF: • implied structure drawn correctly • explanation correct • corrected name.
THREE (a)	Structural isomers have the same molecular formula but they differ in the sequence in which the atoms are joined together.	Correct		
(b)(i) (ii)	(A identified) (*cis*-pent-2-ene)  (*trans*-pent-2-ene) 	Correct Letter AND *cis*-*trans* isomers drawn correctly AND drawn in correct box.		

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
(c)	*Cis-trans* isomers can occur in molecules that have double bonds, because rotation of the atoms about the axis of the carbon to carbon double bond is restricted. They must also have two different groups attached to each of the carbons involved in the double bond. Molecule **A** (pent-2-ene) has a double bond, and each carbon involved in the double bond has two different groups attached to them. Molecule **C** has no double bonds, so cannot exist as *cis-trans* isomers. Molecule **B** and Molecule **D** have double bonds. However each carbon involved in the double bond does not have 2 different groups attached.	ONE of the two requirements for *cis-trans* isomers described. (Doesn't need to refer to Molecule A.)	BOTH of the requirements for *cis-trans* isomers described. Reference to Molecule **A (**pent-2-ene).	Requirements described. Reference to all molecules in box (**A**, **B**, **C**, **D**).
FOUR (a)(i)	 OR ethene	TWO products identified.	TWO products identified linked to corresponding reaction type.	
(ii)	elimination			
(b)(i)	 OR sodium propanoate			
(ii)	acid-base			
(c)(i)	$CH_3-CH_2-CH_3$ OR propane			
(ii)	addition			
FIVE	In both reactions, a colour change from purple to colourless will be seen as purple MnO_4^-/H^+ is reduced to Mn^{2+}. (OR colour change from purple to brown precipitate if non-acidified MnO_4^-.) Ethene will react to form a diol, ethan-1,2-diol: $CH_2CH_2 \xrightarrow{MnO_4^-/H^+} CH_2(OH)CH_2(OH)$ Ethanol will react to form a carboxylic acid, ethanoic acid: $CH_3CH_2OH \xrightarrow{MnO_4^-/H^+} CH_3COOH$	ONE of • Colour change from purple to colourless. • Ethene reacts to form diol / ethan-1,2-diol. • Ethanol reacts to form carboxylic acid / ethanoic acid.	EITHER • Ethene reacts to form diol / ethan-1,2-diol. OR • Ethanol reacts to form carboxylic acid / ethanoic acid. Linked to colour change from purple to colourless.	BOTH • Ethene reacts to form diol / ethan-1,2-diol. AND • Ethanol reacts to form carboxylic acid / ethanoic acid. Linked to colour change from purple to colourless and equations. AND both reactions are oxidation reactions.

Q	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
SIX	**A:**  (butan-1-ol) **B:**  (butanoic acid) **C:**  (butyl butanoate)	A or B correct.	All correct.	
SEVEN	(i) $CH_2(OH)CH(OH)CH_2(OH)$ – propan-1,2,3-triol (ii) $CH_3(CH_2)_{14}COONa$	ONE of $CH_2(OH)CH(OH)CH_2(OH)$ OR $CH_3(CH_2)_{14}COONa$	BOTH $CH_2(OH)CH(OH)CH_2(OH)$ AND $CH_3(CH_2)_{14}COONa$	
EIGHT	**Hexene** will react with a dilute solution of bromine water. This will change from orange to colourless. 1, 2-dibromohexane will be formed. **Hexene** will not react with Zn.  **Ethanoic acid** will react with Zn and fizzing / bubbles will be observed. Zinc ethanoate will be formed. **Ethanoic acid** will not react with a dilute solution of bromine water.  **Ethyl ethanoate** will not react with either dilute solution of bromine water or zinc metal.	EITHER Both hexene and ethanoic acid reactions described with one of bromine water or zinc. Identified with observation. OR One of hexene or ethanoic acid with both bromine water and zinc. Identified with observation.	TWO of hexane / ethanoic acid / ethyl ethanoate with BOTH bromine water and zinc. Identified with observations.	All THREE samples correctly identified with • observations AND • products.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of FIVE opportunities answered at Achievement level or higher $5 \times A$	Total of at least SEVEN opportunities answered with FOUR at Merit level or higher. $4 \times M + 3 \times A$	Total of at least SEVEN opportunities answered with TWO at Excellence level and THREE at Merit level or higher. $2 \times E + 3 \times M + 2 \times A$