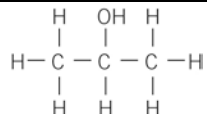
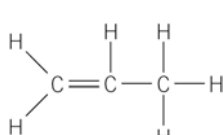


Question number	Answer	Marks	Guidance																		
1	<p>In each section:</p> <ul style="list-style-type: none"> If wrong or no reagent given, no marks for any observations; Penalise incomplete reagent or incorrect formula – but mark observations Mark each observation independently Allow <i>no reaction</i> for no change / no observable reaction in all three parts, but not none or nothing Q says one test. If two tests are given, score zero 																				
1 (a)	<table border="1"> <tr> <td></td> <td>$K_2Cr_2O_7 / H^+$</td> <td>$KMnO_4 / H^+$</td> <td>Lucas test ($ZnCl_2 / HCl$)</td> </tr> <tr> <td>R primary alcohol</td> <td>(Orange) goes green</td> <td>(purple) goes colourless</td> <td>No cloudiness</td> </tr> <tr> <td>S tertiary alcohol</td> <td>no change</td> <td>no change</td> <td>Rapid cloudiness</td> </tr> </table>		$K_2Cr_2O_7 / H^+$	$KMnO_4 / H^+$	Lucas test ($ZnCl_2 / HCl$)	R primary alcohol	(Orange) goes green	(purple) goes colourless	No cloudiness	S tertiary alcohol	no change	no change	Rapid cloudiness	1 1 1	<p>1 mark for reagent, 1 mark for R observation, 1 mark for S observation.</p> <p>allow acidified potassium manganate and acidified potassium dichromate without oxidation numbers</p> <p>Penalise wrong starting colour</p>						
	$K_2Cr_2O_7 / H^+$	$KMnO_4 / H^+$	Lucas test ($ZnCl_2 / HCl$)																		
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1 (b)	<table border="1"> <tr> <td></td> <td>$Na_2CO_3 / NaHCO_3$ named carbonate</td> <td>metal</td> <td>named indicator</td> </tr> <tr> <td>T ester</td> <td>No change</td> <td>No change</td> <td>No effect</td> </tr> <tr> <td>U acid</td> <td>Effervesce nce or (CO_2) gas formed</td> <td>Effervescence or (H_2) gas formed</td> <td>acid colour</td> </tr> </table>		$Na_2CO_3 / NaHCO_3$ named carbonate	metal	named indicator	T ester	No change	No change	No effect	U acid	Effervesce nce or (CO_2) gas formed	Effervescence or (H_2) gas formed	acid colour	1 1 1	<p>1 mark for reagent, 1 mark for R observation, 1 mark for S observation.</p> <p>Also accept</p> <table border="1"> <tr> <td>$PCl_5, PCl_3, SOCl_2$</td> <td>Named alcohol + HCl / H_2SO_4</td> </tr> <tr> <td>no change</td> <td>no change</td> </tr> <tr> <td>Fumes / (HCl) gas formed</td> <td>Sweet smell</td> </tr> </table>	$PCl_5, PCl_3, SOCl_2$	Named alcohol + HCl / H_2SO_4	no change	no change	Fumes / (HCl) gas formed	Sweet smell
	$Na_2CO_3 / NaHCO_3$ named carbonate	metal	named indicator																		
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1 (c)		Fehling's / Benedict's	Tollens' / $[\text{Ag}(\text{NH}_3)_2]^+$	$\text{K}_2\text{Cr}_2\text{O}_7 / \text{H}^+$	1	1 mark for reagent, 1 mark for R observation, 1 mark for S observation. penalise wrong starting colour
	V Ketone	no change	no change	no change	1	
	W aldehyde	Red precipitate	Silver mirror	(Orange) goes green	1	

2	If 2 stage test for one compound, award no marks for that compound, e.g., no mark for ROH or RX to alkene then Br ₂ test.						
	If reagent is wrong or missing, no mark for that test; if wrong but close/incomplete, lose reagent mark but can award for correct observation. In each test, penalise each example of wrong chemistry, e.g., AgCl ₂ .						
	propan-1-ol	Acidified potassium dichromate	sodium	Named acid + conc H ₂ SO ₄	named acyl chloride	PCl ₅	1
		(orange) turns Green	effervescence	Sweet smell	Sweet smell /misty fumes	Misty fumes	1
	propanal	add Tollens OR Fehling's / Benedict's	acidified potassium dichromate	Brady's or 2,4-dnph			1
		Tollens: silver mirror OR Fehling's/ Benedict's: red precipitate	(orange) turns green	Yellow or orange precipitate			1
	propanoic acid	Named carbonate/ hydrogencarbonate	water and UI (paper)	Named alcohol + conc H ₂ SO ₄	Sodium or magnesium	PCl ₅	1
		effervescence	orange/red	Sweet smell	effervescence	Misty fumes	1
	1-chloro propane	NaOH then acidified AgNO ₃	AgNO ₃				1
		white ppt	white ppt				1
if dichromate used for alcohol cannot be used for aldehyde							
if sodium used for alcohol cannot be used for acid							
if PCl ₅ used for alcohol cannot be used for acid							
If acidification missed after NaOH, no mark here but allow mark for observation							

3	 <p>L:</p>	1	Allow (CH ₃) ₂ CHOH OR CH ₃ CH(OH)CH ₃ . Allow name propan-2-ol. Penalise contradiction of name and structure
	 <p>M:</p>	1	Allow CH ₃ CH=CH ₂ . Allow name propene ignore -1- but penalise other numbers. Penalise contradiction of name and structure
	<p>Step 1: NaBH₄ OR LiAlH₄ OR Zn/HCl OR H₂/Ni OR H₂/Pt</p>	1	Ignore name if formula is correct ignore solvent ignore acid (for 2nd step) but penalise acidified NaBH ₄ Apply list principle for extra reagents and catalysts
	nucleophilic addition	1	Accept addition. Penalise electrophilic. Ignore reduction.
	<p>Step 2: conc H₂SO₄ OR conc H₃PO₄ OR Al₂O₃</p> <p>Elimination</p>	1	Apply list principle for extra reagents and catalysts.
	<p>Step 3: HBr</p> <p>electrophilic addition</p>	1 1	Independent from M5 penalise nucleophilic or electrophilic ignore dehydration Apply list principle for extra reagents and catalysts. Independent from M7
4 (a) (i)	C ₆ H ₅ NO ₂	1	
4 (a) (ii)	CH ₃ (CH ₂) ₂ CH ₃	1	
4 (a) (iii)	CH ₃ COOH	1	
4 (b) (i)	catalyst	1	
4 (b) (ii)	catalyst	1	
4 (b) (iii)	oxidising agent	1	
5	Add sodium hydroxide and warm	1	
	Add nitric acid	1	
	Add silver nitrate solution	1	
	If compound A is a chloroalkane a white precipitate of silver chloride would be formed.	1	
6 (a)	aldehyde	1	
6 (b)	propanal	1	
7	Add bromine water to the sample and shake.	1	
	If a C=C is present the bromine water would decolourise.	1	