15 Alcohols
Answers to practice questions

Question number	Answer	Marks	Guidance
1 (a)	aqueous or solution in water *or* (aq) in the equation	1	
	yeast *or* zymase	1	Don't just say 'an enzyme'.
	anaerobic / absence of oxygen / absence of air *or* neutral pH	1	
	T in the range 30–40 °C only	1	Learn these 4 points.
	Fermentation	1	
	$C_6H_{12}O_6 \rightarrow 2CH_3CH_2OH + 2CO_2$	1	
	$CH_3CH_2OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$	1	You can use C_2H_5OH but you should not use C_2H_6O.
1 (b)	dehydration is the elimination of water *or* removal of combined water from a compound / molecule	1	Don't say from a 'substance'.
	catalyst = concentrated H_2SO_4 *or* concentrated phosphoric acid *or* aluminium oxide	1	
	$CH_3CH_2OH \rightarrow H_2C{=}CH_2 + H_2O$	1	You can use C_2H_5OH but you should not use C_2H_6O. Also CH_2CH_2 is not given credit.
2 (a) (i)	compounds with the same molecular formula	1	
	but different structural formulae / different structures	1	This is a definition so should be learnt.
2 (a) (ii)	C_3H_6O only	1	
2 (a) (iii)	CH_2 only	1	
2 (b)	potassium dichromate(VI) / $K_2Cr_2O_7$ and acid / acidified / H_2SO_4 / H^+	1	You can also have $KMnO_4$ / H_2SO_4, but not HCl.
	remains orange *or* no change *or* no reaction	1	Or remain purple if $KMnO_4$ used.
	orange to green	1	Or goes from purple to colourless if $KMnO_4$ in acid used or gives brown precipitate or goes green if $KMnO_4$ neutral or in alkali.

<table>
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<tr><td>2 (c)</td><td>
<u>choice of reagents</u>
<table>
<tr><td>potassium dichromate (VI) / $K_2Cr_2O_7$ and acid / acidified / H_2SO_4 / H^+ or $KMnO_4$ / H_2SO_4</td><td>Fehling's / Benedict's reagent</td><td>Tollens' reagent or $AgNO_3$ / NH_3 or ammoniacal silver nitrate Not $AgNO_3$ alone.</td></tr>
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<u>with the aldehyde C</u>
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<tr><td>goes orange to green

goes purple to colourless / brown ppt. / green solution if KMnO4 used red solid

Potassium dichromate is more usual to do in school.</td><td>red solid</td><td>silver mirror</td></tr>
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<u>with the ketone D</u>
<table>
<tr><td>remains orange or no change or no reaction or purple for $KMnO_4$</td><td>remains blue or no change or no reaction</td><td>remains colourless or no change or no reaction</td></tr>
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1</td><td>These tests always come up, so learn the tests to distinguish aldehydes and ketones. If you can't learn them all pick one to really learn.</td></tr>
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2 (d)	<u>bromine</u> alkane remains yellow / orange *or* no change *or* no reaction the alkene goes colourless *or* decolourised	1 1 1	This is the test for unsaturation. Don't say goes clear! If both observations are the same then you will get no credit for either.
3 (a) (i)	$CH_3CH_2CH_2CH_2CHO + [O] \rightarrow CH_3CH_2CH_2CH_2COOH$	1	*Hint:* In this case you can put C_4H_9CHO going to C_4H_9COOH
3 (a) (ii)	pentanoic acid	1	
3 (b) (i)	$CH_3CH_2CH_2CH_2CH_2OH$ *or* Pentan-1-ol	1	
3 (b) (ii)	primary	1	You will be given credit for the abbreviation 1° or 1^y
4 (a)	$CH_3CH_2CH_2CH_2OH$ $CH_3CH(OH)CH_2CH_3$	1 1	
4 (b)	correct structures drawn for butanal, butanone and butanoic acid *or* the reaction of butan-1-ol with [O] to produce butanal and water balanced equation for the reaction of butan-1-ol with [O] to produce butanoic acid and water *or* balanced equation for the reaction of butanal with [O] to produce butanoic acid balanced equation for the reaction of butan-2-ol with [O] to produce butanone and water	3 1 1 1	
4 (c)	correct structure drawn for 2-methylpropan-2-ol *name:* 2-methylpropan-2-ol	1 1	You must show the alcohol as –O–H. If you put C–H–O, then it looks like an aldehyde and will be marked wrong
5 (a)	compounds with the same molecular	1	

	formula but different structures due to different positions of the same functional group on the same carbon skeleton / chain	 1	 Another definition to learn!
5 (b)	compound A is butan-1-ol only compound C is a ketone	1 1	
5 (c) (i)	oxidation *or* redox	1	
5 (c) (ii)	$K_2Cr_2O_7$ *or* potassium dichromate(VI) acidified *or* H_2SO_4	1 1	If you write the 'dichromate ion' it will be marked wrong. A reagent must come out of a bottle. You must state the acid not just put H^+
5 (c) (iii)	heat under reflux	1	
5 (c) (iv)	correctly drawn structure of 2-methylpropan-2-ol	1	Use clearly drawn C–C and C–O bonds
5 (c) (v)	correctly drawn structure of methanoic acid	1	You must have C–O and C=O displayed.
5 (d) (i)	Tollens' reagent or ammoniacal silver nitrate *or* Fehling's/Benedict's reagent *or* acidified potassium dichromate(VI)	1	
5 (d) (ii)	correctly drawn structure of methylpropanal	1	You must have C–H and C=O of aldehyde displayed.
6 (a)	Fermentation dehydration *or* elimination	1 1	
6 (b) (i)	yeast / zymase	1	
6 (b) (ii)	concentrated sulfuric acid *or* phosphoric acid	1	This is not aqueous or dilute acid.
6 (c) (i)	primary *or* 1°	1	
6 (c) (ii)	sugar or glucose or ethanol is renewable *or* ethanol does not contain sulfur-containing impurities *or* ethanol produces less pollution *or* is less smoky *or* less CO / C	1	This type of answer is really common sense.

6 (d)	$C_2H_6 \rightarrow C_2H_4 + H_2$	1	