Solutions

Each answer shows the steps, then the **result**.

2.1

(a)

- a carboxylic acid

(b)

- a ketone

2.2

- orange to green

2.3

- $2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2$

2.4

- **propanone**

3.1 C

- Tertiary alcohols are not oxidised

3.2 B

- Distil off the aldehyde before it is further oxidised

3.3

(a)

- add acidified potassium dichromate(VI) and warm; the secondary alcohol turns it from orange to green (oxidised to a ketone); the tertiary alcohol leaves it orange (not oxidised)

(b)

- pass the ethanol vapour over hot Al_2O_3 (or heat with concentrated sulfuric/phosphoric acid)

3.4

- the alkyl group pushes electron density onto the oxygen, making the ethoxide ion (RO^-) less stable than OH^-, so ethanol holds its H^+ more tightly – weaker acid

3.5

(a)

- **propan-2-ol**
- **butan-2-ol**

(b)

- a positive test needs the $CH_3CH(OH)-$ group: a methyl group on the carbon carrying the OH, which also carries an H
- propan-1-ol has no CH_3 on that carbon, and 2-methylpropan-2-ol is tertiary, with no H on that carbon

3.6

- steamy white fumes (of HCl) are given off
- **chloroethane**

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