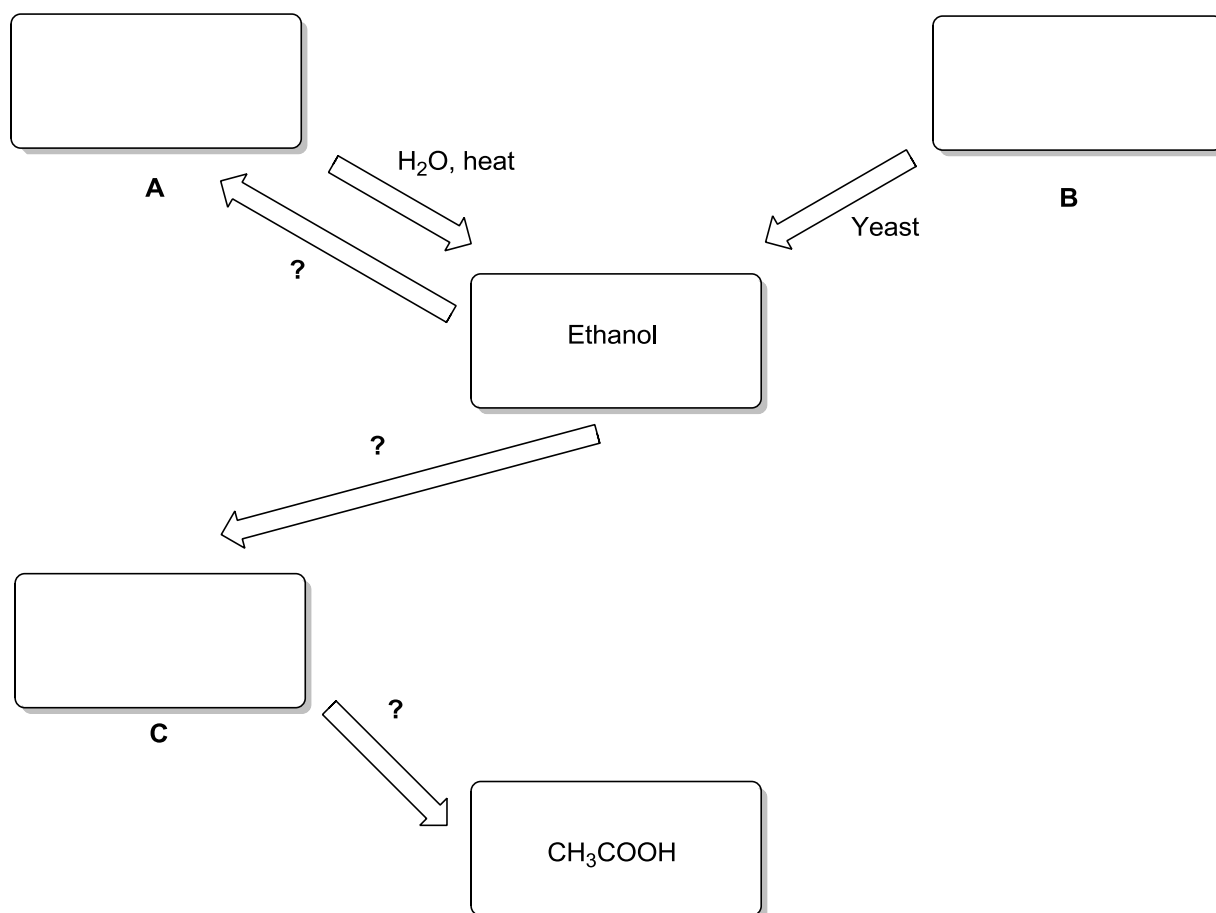




STARTER FOR 10!!!

5.3.4 Alcohols as intermediates

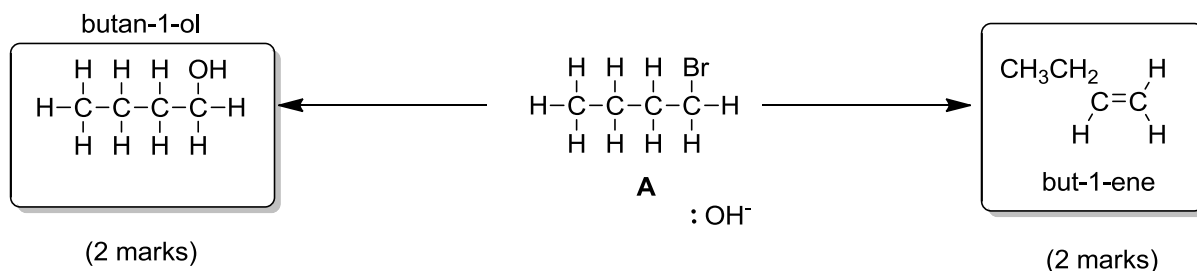
Alcohols are useful intermediates. The scheme below shows how ethanol can be formed and reacted to give various products. Complete the diagram with the structures of A-C and the missing reagents. (5 marks)



1. Name the process by which the source material B is transformed into ethanol and write a balanced equation for this process. (2 marks)
2. Of the two source materials A and B, B is considered to be more sustainable. Explain why. (1 mark)
3. The conversion of ethanol to A can be classed as dehydration. Explain why this is the case. (1 mark)
4. Which substance can be tested for using aqueous sodium bicarbonate solution? (1 mark)

5.3.2

1. (a)



2. Substitution – the OH⁻ acts as a nucleophile

Elimination – the OH⁻ acts as a base

3. Substitution – aqueous NaOH

Elimination – ethanolic NaOH

4. H-Br, electrophilic addition

5.3.3

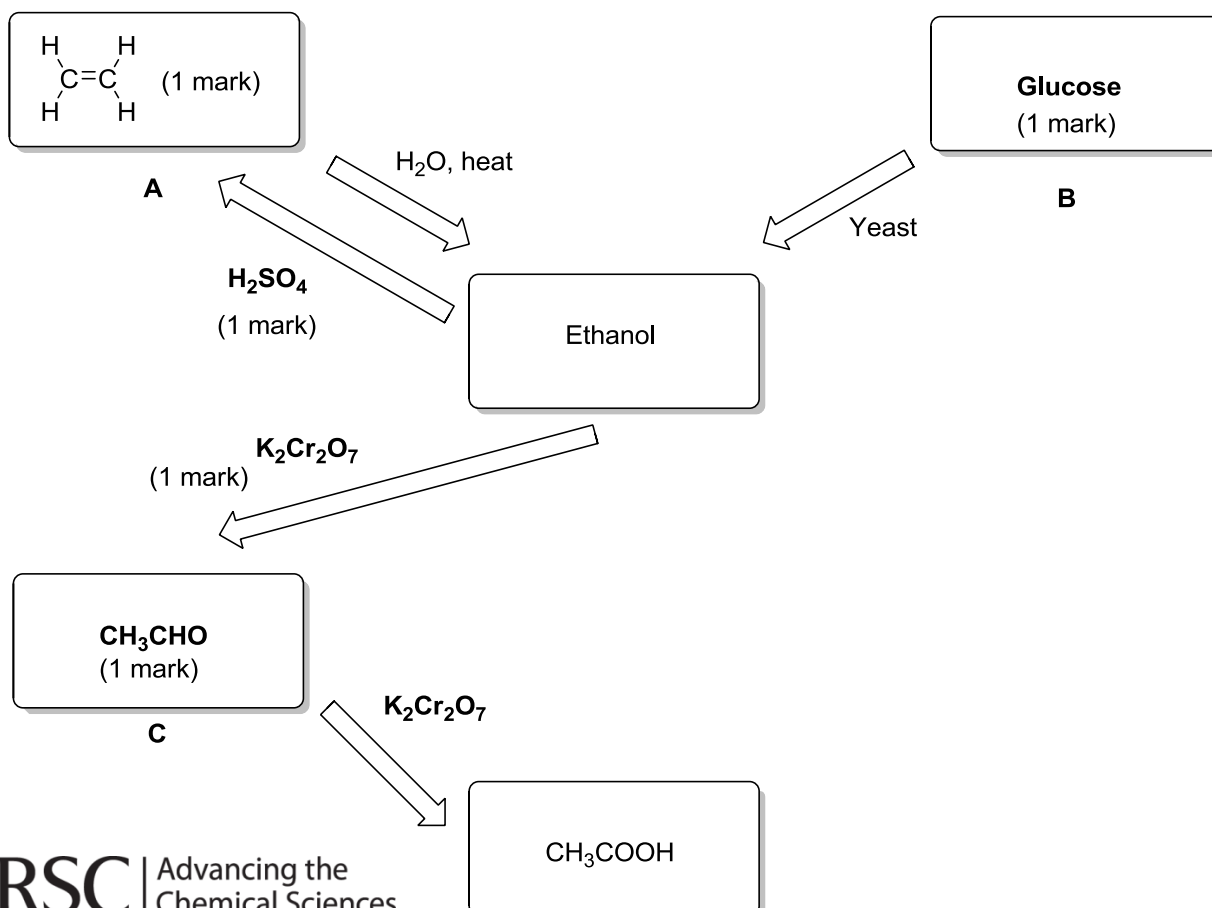
1. C + E

2. A + B

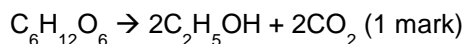
3. A, B, D, E, F, G

5.3.4

1.



2. Fermentation (1 mark)



3. The source material is renewable
4. Ethanoic acid/the acid

5.4.1

1. Species 1 = cyclohexane (1 mark)
Species 2 = chlorocyclohexane (1 mark)
Species 3 = cyclohexanol (1 mark)
Species 4 = cyclohexene (1 mark)
2. A Cl_2 + UV light (1 mark)
B aqueous sodium hydroxide (1 mark)
C $\text{H}_2(\text{g})/\text{Pt}$ (1 mark)
3. Free radical substitution (1 mark)
4. secondary (1 mark)
5. Bromine water (1 mark)

5.4.2

1. 1 mark for correct calculation method mass/Mr
Bromocyclohexane = $1.00/163.03 = 6.13 \times 10^{-3}$ moles (1 mark)
Cyclohexanol = $0.46/100.16 = 4.59 \times 10^{-3}$ moles (1 mark)
2. 74.9% (1 mark)
3. Nucleophilic substitution (1 mark)
Arrow from OH^- with lone pair shown to the C of the C-Br bond (1 mark)
Arrow from the C-Br bond to the Br atom (1 mark)
4. Infrared spectroscopy (1 mark)
5. cyclohexene (1 mark)
Elimination (1 mark)

5.4.3

1. A is ethene ($\text{CH}_2=\text{CH}_2$) (1 mark)
2. Fermentation (1 mark)
Yeast (or zymase) (1 mark)
Any one from (1 mark)
Temperature between 38-45°C
Anaerobic conditions
3. Aqueous NaOH (1 mark)
4. Primary alcohol (1 mark)