InkChemistry

QUESTION WORKBOOK

Oxidation and elimination of alcohols

Alkenes and alcohols · Unit C18

AQA 3.3.5.2, 3.3.5.3 · OCR A 4.2.1

19 questions · 62 marks

NAVY SCREEN EDITION

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SECTION A · Short, 1 to 2 marks

A1 OE-Q3

Give an equation, using [O] to represent the oxidising agent, for the oxidation of propan-1-ol to propanoic acid. [2]

A2 OE-Q13

Suggest a test to show that the distillate from the oxidation of propan-1-ol contains an aldehyde and not a ketone, giving the result. [2]

A3 OE-Q17

Suggest the organic product of heating cyclohexanol with concentrated phosphoric acid, and a test to identify it. [2]

A4 OE-Q21

Explain how measuring the boiling temperature of a distillate shows whether it is pure propanal. [2]

SECTION B · Standard, 3 to 5 marks

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B1 OE-Q8

Outline the mechanism for the dehydration of propan-2-ol to propene in the presence of concentrated sulfuric acid. [4]

B2 OE-Q10

Explain why pentan-2-ol gives three alkenes when it is dehydrated, but pentan-3-ol gives only two. [4]

B3 OE-Q18

Give the reagents and conditions used to convert butan-1-ol into 1-bromobutane, an equation for the reaction of the alcohol, and the reason 50% concentrated sulfuric acid is used rather than fully concentrated acid. [4]

B4 OE-Q1

Give the reagents used to oxidise propan-2-ol in the laboratory, the colour change seen, and the name of the organic product. [3]

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B5 OE-Q4 Explain why propanal is distilled out of the reaction mixture as soon as it forms when it is made by oxidising propan-1-ol. [3]

B6 OE-Q5 Explain why 2-methylpropan-2-ol is not oxidised by acidified potassium dichromate(VI). [3]

B7 OE-Q6 Describe how apparatus for heating under reflux is set up, and why it is used to make a carboxylic acid from a primary alcohol. [3]

B8 OE-Q9 Identify the three alkenes formed when butan-2-ol is heated with concentrated phosphoric acid. [3]

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B9 OE-Q11 Calculate the percentage yield when 6.00 g of propan-1-ol gives 2.90 g of propanal. Mr: propan-1-ol 60.0, propanal 58.0. [3]

B10 OE-Q12 Calculate the minimum mass of potassium dichromate(VI), $K_2Cr_2O_7$ (Mr 294.2), needed to oxidise 1.38 g of ethanol (Mr 46.0) to ethanal. The half-equations are $Cr_2O_7^{2-}(aq) + 14H^+(aq) + 6e^- \rightarrow 2Cr^{3+}(aq) + 7H_2O(l)$ and $CH_3CH_2OH(l) \rightarrow CH_3CHO(l) + 2H^+(aq) + 2e^-$. [3]

B11 OE-Q14 Suggest why propanal collected in a school preparation is often contaminated with propan-1-ol and water, and suggest how a purer sample could be obtained. [3]

B12 OE-Q15 Compare the apparatus and the purpose of distillation and of heating under reflux in the oxidation of a primary alcohol. [3]

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B13 OE-Q16 Explain why the receiver is cooled in ice and water, and why the thermometer bulb is placed level with the side arm, when propanal is distilled. [3]

SECTION C · Long, 6 marks or more

C1 OE-Q7 Describe how a sample of propanal can be prepared from propan-1-ol and collected, including the apparatus and the conditions that keep the yield of propanal high. [6]

C2 OE-Q19 Describe how a pure, dry sample of 2-chloro-2-methylpropane is prepared from 2-methylpropan-2-ol and concentrated hydrochloric acid and separated from the reaction mixture. [6]

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