

Dr Clays A-level Chemistry

UNIT 3 TOPIC 3
ALKENES & ALCOHOLS

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Unit 3 Topic 3– Alkenes & Alcohols

EXERCISE 1 – addition reactions of alkenes

1. Write equations, using displayed formulae, to show the conversion of but-1-ene into:

   a) polybut-1-ene

   b) butan-2-ol

   c) 2-bromobutane

   d) 1,2-dibromobutane

2. a) Explain why alkenes tend to react with electrophiles.

   b) Show the mechanisms for the following reactions:

      i) ethene with bromine

      ii) but-2-ene with hydrogen bromide

      iii) ethene with concentrated sulphuric acid

   c) Explain how bromine can behave as an electrophile.

3. The following reactions give two products in unequal amounts. In each case, identify the two products, state which is the major product, explain why it is the major product and give the mechanism for its formation.

   a) but-1-ene with HBr

   b) methylpropene with concentrated sulphuric acid

EXERCISE 2 – Alcohols

1. Write equations to show the production of ethanol by

i) fermentation of glucose

ii) hydration of ethene

Give the conditions needed for each process and state the relative advantages and disadvantages of each process.

2. Identify the organic product or products formed by the dehydration of

a) ethanol

b) butan-1-ol

c) butan-2-ol

d) dimethylpropan-1-ol

3. Give the names and structures of all eight alcohols with the formula $C_5H_{12}O$. State in each case whether they are primary, secondary or tertiary alcohols.

a) Identify the three isomers which can give two different alkenes when dehydrated and identify the possible alkene products in each case.

b) Identify the seven alcohols which can undergo mild oxidation and identify the oxidation products in each case.

c) Of these oxidation products, four can undergo further oxidation. Identify these four aldehydes and identify the further oxidation product in each case.

4. Using structural formulae, write equations for the following processes:

a) mild oxidation of propan-1-ol

b) oxidation of butanal

c) oxidation of propan-2-ol