

Alkenes and Addition Reactions

Q1. (2018) – 10b

- *(b) A student is provided with unlabelled samples of three liquids.
The three liquids are known to be
hexane, C_6H_{14} , a liquid alkane
hexene, C_6H_{12} , a liquid alkene
butanoic acid, $C_4H_8O_2$, a carboxylic acid, in aqueous solution

Aqueous solutions of carboxylic acids contain hydrogen ions and undergo reactions typical of acids with indicators and carbonates.

Describe, in detail, using the information given and your knowledge of the reactions of these liquids, tests the student should carry out to identify each of the three liquids.

You should include balanced equations for any chemical reactions described.

(6)

Q2. (2020)

- 4 Figure 2 shows the structure of a molecule of dichloroethene.

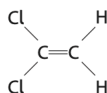


Figure 2

A)

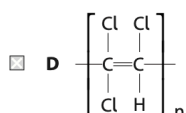
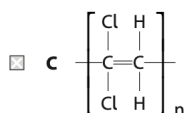
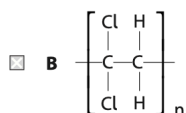
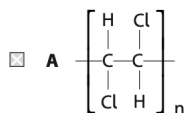
- (a) (i) Describe how dichloroethene monomers form a polymer.

(2)

B)

- (ii) Which of these represents the structure of the polymer formed from the monomer in Figure 2?

(1)



C)

- (iii) Separate samples of dichloroethene and poly(dichloroethene) are shaken with a few drops of bromine water.

What would be **seen**?

(1)

- ☐ A both mixtures remain orange
- ☐ B only the dichloroethene and bromine water goes colourless
- ☐ C only the poly(dichloroethene) and bromine water goes colourless
- ☐ D both mixtures go colourless

Q3. (2021) – 4b

- (b) Poly(chloroethene) is a polymer made from chloroethene.
A molecule of chloroethene is shown in Figure 5.

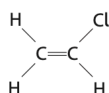


Figure 5

- (i) On Figure 5, draw a circle around the functional group in this molecule.

(1)

Q4. (2021) – 6c (ii)

- (c) The reaction between calcium carbonate and dilute hydrochloric acid was investigated at different temperatures.

- (ii) Figure 8 shows a graph of volume of gas collected in this investigation.

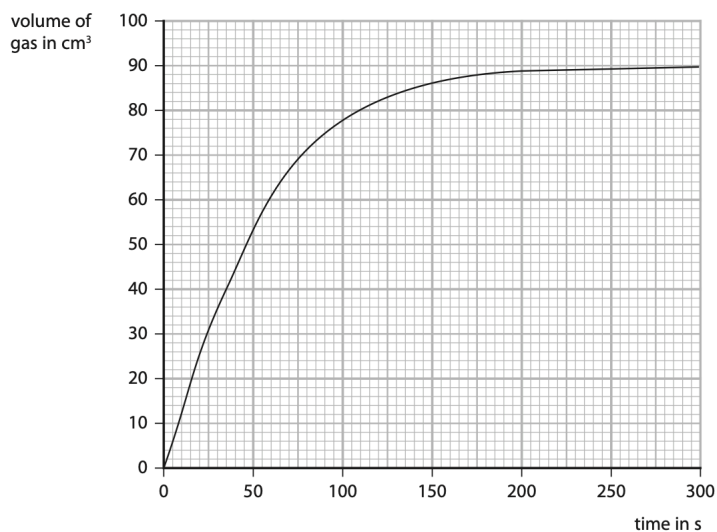


Figure 8

- Draw a tangent at 100 seconds on Figure 8.
Use this tangent to calculate the rate of reaction at this time.

(2)

rate of reaction = ... $\text{cm}^3 \text{s}^{-1}$

Q5. (2021) – 10a (ii)

- 10 (a) Propanol, C_3H_7OH , can undergo reactions to form compounds **Y** and **Z** shown in Figure 14.

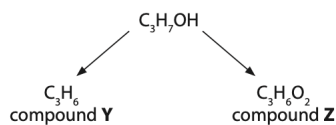


Figure 14

- (ii) Compound **Y** can also be formed in the following reaction



Explain how bromine water can be used to distinguish between compound **X** and compound **Y**.

(3)

Q6. (2022) – 10a (ii)

- 10 (a) Figure 14 shows the structure of a molecule of hydrocarbon **Z**, C_4H_8 .

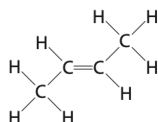


Figure 14

- (ii) Complete the balanced equation for the reaction of hydrocarbon **Z**, C_4H_8 , with bromine.

(2)



Q7. (2023) – 7a (ii)

- 7 Figure 12 shows the structure of the molecules of three organic compounds.

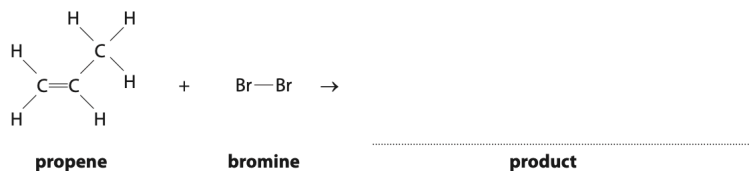
propene	propanoic acid	ethanol

Figure 12

- (ii) Propene reacts with bromine water.

Complete the equation for the reaction of propene with bromine by drawing the structure of a molecule of the product.

(2)



Q8. (2024) – 10b

(b) Poly(phenylethene) is an addition polymer.

Figure 14 shows part of the poly(phenylethene) molecule formed in the addition reaction between three phenylethene monomer molecules.

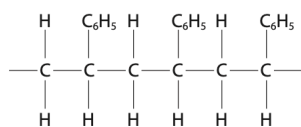


Figure 14

A)

(i) Draw the structure of **one** phenylethene monomer molecule.

(2)

B)

(ii) Explain what is **seen** when a few drops of bromine water are shaken with phenylethene.

(3)