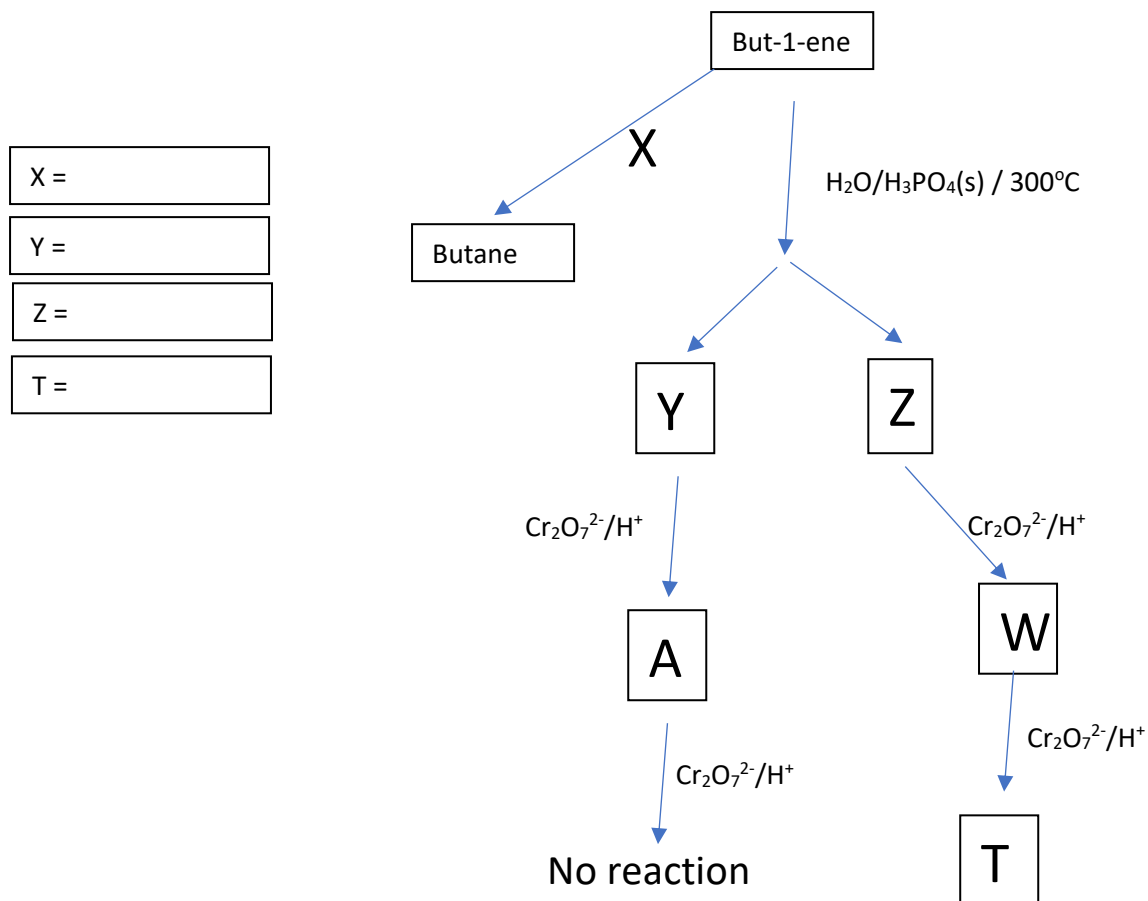


Video worksheet – revision organic pathways, polymerisation, naming, analytical chemistry.

1. Consider the pathway shown below.



a. What volume of a 5.10 M Br_2 solution is required to react completely with 5.60 grams of but-1-ene dissolved in an appropriate solvent.

b. Name each compound and reagent in the corresponding box above.

c. What class of reaction is the formation of butane from but-1-ene? Justify your answer.

d. Draw the skeletal formula of "A" and "W" in the box on the right

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e. Compound "W" undergoes a redox reaction in the presence of $\text{Cr}_2\text{O}_7^{2-}$ in an acidified solution to form compound "T". During this process the reaction mixture changes from an orange colour, due to the $\text{Cr}_2\text{O}_7^{2-}$ ion, to a green colour, due to the Cr^{3+} ion.

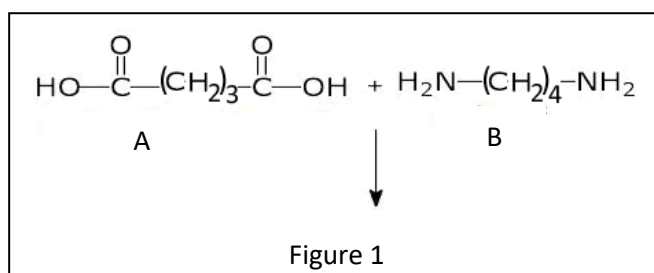
i. Write the oxidation half equation (states not required)

ii. Write the reduction half equation (states not required)

2. Consider the polymerisation reaction between the two monomers shown in figure 1.

a. Name the:

i. type of reaction that takes place between the two molecules.



ii. type of functional group that joins the two molecules.

b. Draw the repeating unit of the polymer formed from these monomers.

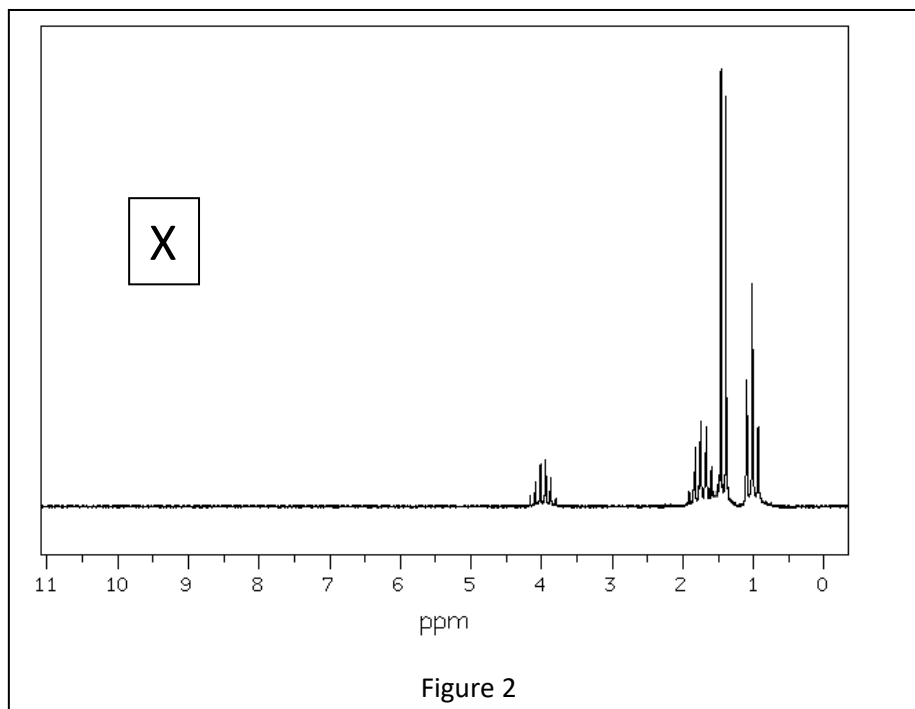


c. Name the monomers

A _____

B _____

3. Consider the following reaction, But-1-ene + HCl \rightarrow X
 The $^1\text{H-NMR}$ of compound "X" is shown in figure 2, below.

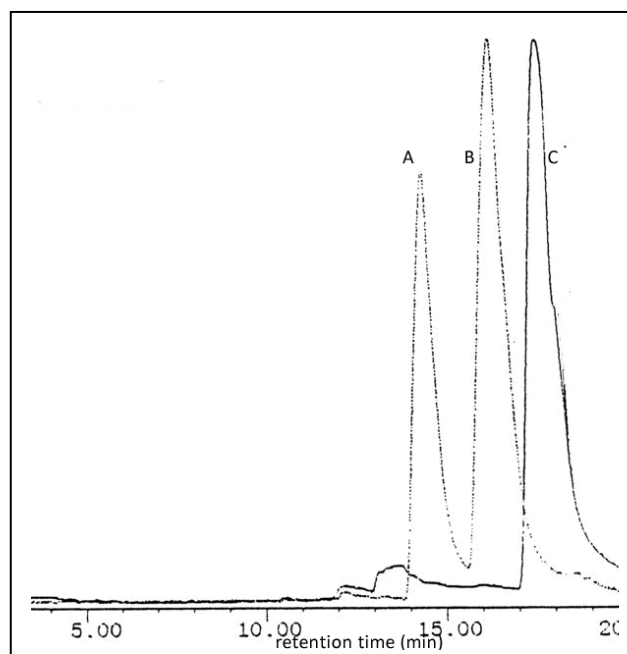


- Name **two** possible structural isomers of compound "X" as it is formed in the reaction shown above.
- Using the $^1\text{H-NMR}$ spectrum shown in figure 2 identify "X". Justify your choice using the splitting pattern shown in figure 2 and the n+1 rule.
- Consider the reaction But-1-ene + HCl \rightarrow X
 - What class of reactions does this reaction belong to?
 - What is the atom economy for this type of reaction? Explain
- How many optically active isomers exist for compound "X".

- e. Consider the two isomers of "X" given as an answer to question a. above.
- What are the similarities between the $^1\text{H-NMR}$ spectra of both compounds?
 - What differences exist in the splitting patterns of each spectrum?

4. A mixture of pentane, 2-methylbutane, 2,2-dimethylpropane was run through a *reversed-phase* HPLC column and the following chromatogram obtained.

- a. Identify compounds A, B and C.
Justify your selection.



- What substance/s has/have the highest concentration in the mixture. Explain.
- Can the concentration of each substance in the mixture be obtained using the chromatogram alone? Explain.
- What changes can be made to the column to remove overlap of signals.