Chemistry 2.5 AS 91165

Demonstrate understanding of the properties of selected organic compounds

WORKBOOK

Working to Excellence

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Writing Excellence answers to **Cis-Trans Isomers** questions

Cis-Trans Isomers QUESTION
Question: Molecule **D** can exist as geometric (*cis* and *trans*) isomers, with both isomers having the same molecular formula. Draw the geometric (*cis* and *trans)* isomers for molecule **D** in the boxes below. Justify why molecule **D** can exist as geometric (*cis* and *trans)* isomers. Your answer should include: • an explanation of the requirements for *cis* and *trans* isomers • reference to the structure of molecule **D**.

A $CH_3\overset{Cl}{\overset{\vert}{C}}HCH_2CH_3$	**B** $CH_3CH_2CH_2Cl$
C $CH_3CH_2CHCCl_2$	**D** $CH_3CH_2CHCHCl$
E $CH_3CH_2CH_2CHCl_2$	**F** $CH_3CH_2CH_2CH_2Cl$

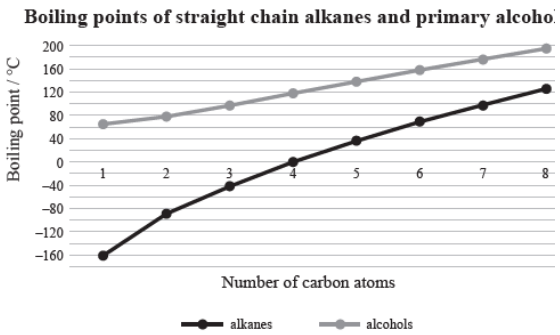
ANSWER		
1. **Draw** the cis and trans isomers If you need to select the molecule make sure that it has both: a C=C double bond and 2 different groups of each C	Cis Name:	Trans Name:
2. link the presence of a **double C=C** bond to lack of rotation		
3. link the requirement of **two different groups** of each of the C on the double		
4. link the requirements above to your **specific molecule** (D)		
5. Explain how two geometric isomers can have the **same molecular formula**		

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.

Chemistry 2.5 AS 91165 Demonstrate understanding of the properties of selected organic compounds

Writing Excellence answers to **Physical Properties of Organic Compounds** questions

Solubility - Physical Properties of Organic Compounds QUESTION	
Question: Explain why two layers form in **Reaction One**. Hexane reacts with bromine water	
ANSWER	
1. Identify the **functional group** of your substance (hexane) and name the product formed.	
2. link observation (layers forming) to the **polarity** of the substance	
3. identify the polarity of the **bromine water** and link to the substances being **immiscible** (forming 2 layers)	

Melting point - Physical Properties of Organic Compounds QUESTION	
Question: Identify the trends shown on the graph. Identify which alkanes will be gases at room temperature (20°C) according to the graph beside. 	
ANSWER	
1. link the **boiling point trend** to **number of carbons** in <u>both groups</u> (when explaining trends on a line graph always relate one variable to the other)	
2. **Identify** which alkanes (number of carbons) are gases at room temp. (will have boiling point below 20°C)	

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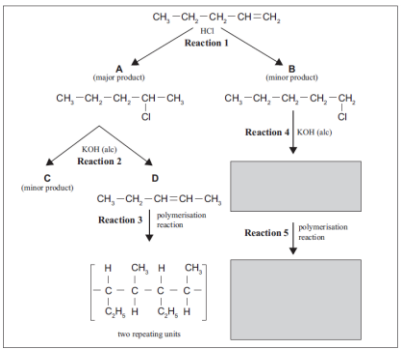
Chemistry 2.5 AS 91165 Demonstrate understanding of the properties of selected organic compounds

Writing Excellence answers to **Polymers** questions

Polymers QUESTION
Question: Draw TWO repeating units of the polymer formed in **Reaction 5**. Explain why the formation of the polymer from its monomer is classified as an addition polymerisation reaction. Compare and contrast the polymer formed in **Reaction 5** to the polymer formed in **Reaction 3**. In your answer you should explain why the polymers formed in these two reactions are different.



ANSWER		
1. Identify the **monomer**, then draw the **polymer** (**identify C 1 and C2** in monomer either side of the double bond then draw a chain of C (4 for 2 repeating units) and add on groups of each one **removing double bond**)	monomer	polymer
2. explain the definition of **addition polymerisation**		
3. **molecule 1** (reaction 5) – describe the 2 groups of each end of the double bonded carbons		
4. **molecule 2** (reaction 3) – describe the 2 groups of each end of the double bonded carbons		
5. Explain that molecule 1 and 2 are **structural isomers** but have the same molecular formula		

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Chemistry 2.5 AS 91165 Demonstrate understanding of the properties of selected organic compounds

Writing Excellence answers to **Haloalkane reactions** questions

Haloalkane reactions QUESTION
Question: Chloroethane, CH_3CH_2Cl, reacts with aqueous KOH, alcoholic KOH, and with NH_3. Compare and contrast the reactions of chloroethane with the three reagents. In your answer you should include: • the type of reaction occurring and the reason why it is classified as that type • the type of functional group formed • equations showing structural formulae for reactions occurring.

ANSWER	
Reaction 1 Chloroethane reacts with $KOH_{(aq)}$	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation
Reaction 2 Chloroethane reacts with $KOH_{(alc)}$	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation
Reaction 3 Chloroethane reacts with $NH_{3(alc)}$	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation

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Writing Excellence answers to **Alcohol Reactions** questions

Alcohol Reactions QUESTION
Question: Butan-1-ol can react separately with each of PCl_5, $Cr_2O_7^{2-}$ / H^+, and concentrated H_2SO_4. Elaborate on the reactions of butan-1-ol with each of the three reagents. For each reaction, your answer should include: • the type of reaction occurring and the reason why it is classified as that type • the name of the functional group formed in each product • the structural formula of the **organic** product.

ANSWER	
Reaction 1 Butan-1-ol reacts with PCl_5	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation
Reaction 2 Butan-1-ol reacts with $Cr_2O_7^{2-}$ / H^+	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation
Reaction 3 Butan-1-ol reacts with concentrated H_2SO_4	Product formed
	Reaction type
	Condensed Structural Formula equation
	Structural Formula equation

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Writing Excellence answers to **Alkene Reactions** questions

Alkene Reactions QUESTION	
Question: Ethene, $C_2H_{4(g)}$, reacts with aqueous potassium permanganate solution, **$KMnO_{4(aq)}$**, dilute acid, **H_2O / H^+**, and hydrogen bromide, **HBr.** Compare and contrast the reactions of ethene gas with each of these three reagents. In your answer, you should: • describe any observations that can be made • identify, with reasons, the type of reaction ethene undergoes with each reagent • describe the functional group of the products formed • include equations showing the structural formulae for the organic compounds for each reaction.	
ANSWER	
Reaction 1 Ethene, $C_2H_{4(g)}$ *reacts with* aqueous potassium permanganate solution, **$KMnO_{4(aq)}$**,	Observations
	Reaction type
	Functional group of products
	Structural Formula equation
Reaction 2 Ethene, $C_2H_{4(g)}$ *reacts with* dilute acid, **H_2O / H^+**	Observations
	Reaction type
	Functional group of products
	Structural Formula equation
Reaction 3 Ethene, $C_2H_{4(g)}$ *reacts with* hydrogen bromide, **HBr.**	Observations
	Reaction type
	Functional group of products
	Structural Formula equation
Summary of the three reactions	

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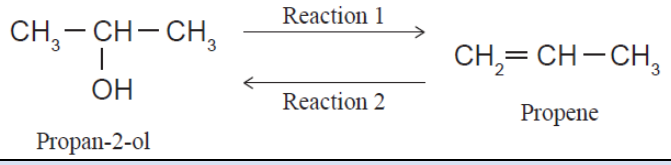
Writing Excellence answers to **Major and Minor products** questions

Major and Minor Products QUESTION
Question: In Reaction 1, propan-2-ol can be converted to propene. In Reaction 2, propene can be converted back to propan-2-ol. Analyse BOTH of these reactions by: ❑ describing the reagents and conditions needed for each reaction to occur ❑ identifying each type of reaction and explaining your choice ❑ explaining why Reaction 1 forms only a single organic product, but Reaction 2 forms a mixture of organic products. 

ANSWER		
1. Reaction 1 Propan – 2-ol forms propene	**Reagent and conditions**	
	Reaction type	
	Structural Formula	
2. Reaction 2 Propene forms propanol Label each structure with name and whether it is major or minor	**Reagent type and conditions**	
	Reaction type	
	Structural Formula Product type: Name:	Product type: Name:
3. Explain why <u>reaction one</u> forms only **one product** linked to symmetry		
4. State Markovnikov's rule **AND** Explain the reason <u>reaction two</u> produces **two products** linked to Markovnikov's rule and asymmetry, including which is major and which is minor.		

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Writing Excellence answers to **Identifying Unknowns** questions

Identifying Unknowns QUESTION
Question: Question: 1c: Four separate colourless organic liquids are known to be: • ethanol • ethanoic acid • hex-2-ene • 1-aminohexane Write a procedure to identify each of these organic liquids using **only** the reagents listed below. • acidified dichromate solution, $Cr_2O_7^{2-}$ / $H^+_{(aq)}$ • bromine water, $Br_{2(aq)}$ • sodium carbonate solution, $Na_2CO_{3(aq)}$. In your answer, you should: • identify the test reagents used • describe any observations that would be made • identify the type of reaction that occurs • identify the organic product of any reaction. You do not need to include equations in your answer.

ANSWER	
Step 1	Test reagents used
	Observations
	Type of reaction that occurs
	Organic product of any reaction
Step 2	Test reagents used
	Observations
	Type of reaction that occurs
	Organic product of any reaction
Step 3.	Test reagents used
	Observations
	Type of reaction that occurs
	Organic product of any reaction
Step 4.	Test reagents used
	Observations
	Type of reaction that occurs
	Organic product of any reaction

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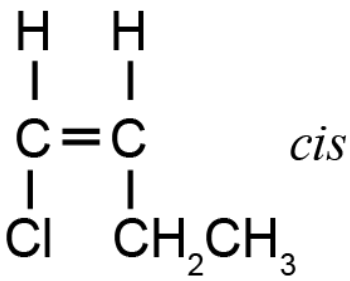
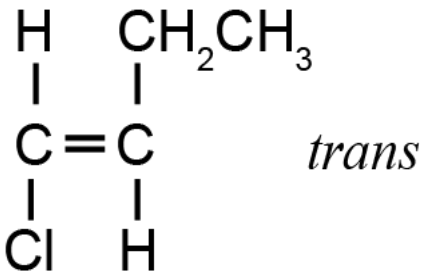
Writing Excellence answers to **Cis-Trans Isomers** questions

Cis-Trans Isomers QUESTION
Question: Molecule **D** can exist as geometric (*cis* and *trans*) isomers, with both isomers having the same molecular formula. Draw the geometric (*cis* and *trans)* isomers for molecule **D** in the boxes below. Justify why molecule **D** can exist as geometric (*cis* and *trans)* isomers. Your answer should include: • an explanation of the requirements for *cis* and *trans* isomers • reference to the structure of molecule **D**.

A $CH_3CH(Cl)CH_2CH_3$	**B** $CH_3CH_2CH_2Cl$
C $CH_3CH_2CHCCl_2$	**D** $CH_3CH_2CHCHCl$
E $CH_3CH_2CH_2CHCl_2$	**F** $CH_3CH_2CH_2CH_2Cl$

ANSWER		
1. **Draw** the cis and trans isomers If you need to select the molecule make sure that it has both: a C=C double bond and 2 different groups of each C (name of molecules not normally required as part of the question)	Cis  *cis* Name: cis 1-chlorobut-1-ene	Trans  *trans* Name: trans 1-chlorobut-1-ene
2. link the presence of a **double C=C** bond to lack of rotation	For *cis* and *trans* isomers to occur a **carbon-carbon double bond** must be present as this prevents any rotation about this bond, and the atoms or groups of atoms attached to the two carbon atoms are therefore fixed in position.	
3. link the requirement of **two different groups** of each of the C on the double	They must also have two different groups attached to each carbon (involved in the double bond).	
4. link the requirements above to your **specific molecule** (D)	This molecule has a carbon-carbon double bond. One carbon of the double bond is attached to a hydrogen atom and an ethyl group. The other is attached to a hydrogen atom and a chlorine atom.	
5. Explain how two geometric isomers can have the **same molecular formula**	When these two requirements are met, the two haloalkenes can have the same molecular formula and the same sequence of atoms in the formula, but a different arrangement in space (a different 3D formula), hence they are *cis* and *trans* isomers.	

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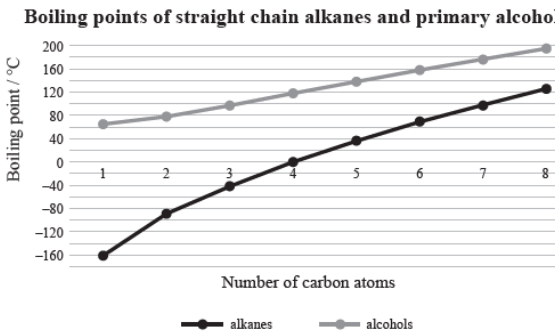
Writing Excellence answers to **Physical Properties of Organic Compounds** questions

Solubility - Physical Properties of Organic Compounds QUESTION	
Question: Explain why two layers form in **Reaction One**. Hexane reacts with bromine water	
ANSWER	
1. Identify the **functional group** of your substance (hexane) and name the product formed.	Hexane is an alkane, with single bonded carbons. When reacting with bromine water it will form a haloalkane (bromohexane) during a substitution reaction
2. link observation (layers forming) to the **polarity** of the substance	Two layers form in Reaction One as **hexane is non-polar** and the product (bromohexane) is effectively also non-polar.
3. identify the polarity of the **bromine water** and link to the substances being **immiscible** (forming 2 layers)	The water from the **bromine water is polar** and therefore the non-polar organic reactant and product will not dissolve in the water; because of this, two layers form as this polar and non-polar layer do not mix.

Melting point - Physical Properties of Organic Compounds QUESTION	
Question: Identify the trends shown on the graph. Identify which alkanes will be gases at room temperature (20°C) according to the graph beside.	
ANSWER	
1. link the **boiling point trend** to **number of carbons** in <u>both groups</u> (when explaining trends on a line graph always relate one variable to the other)	The boiling points of both alkanes and alcohols increase as the number of C atoms increases. The boiling points of alcohols are always higher than the alkanes (with the same number of C atoms).
2. **Identify** which alkanes (number of carbons) are gases at room temp. (will have boiling point below 20°C)	Alkanes with 1, 2, 3, and 4 C atoms (methane, ethane, propane, and butane) will be gases at room temperature.

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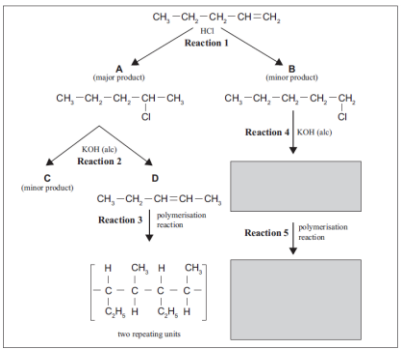
Writing Excellence answers to **Polymers** questions

Polymers QUESTION
Question: Draw TWO repeating units of the polymer formed in **Reaction 5**. Explain why the formation of the polymer from its monomer is classified as an addition polymerisation reaction. Compare and contrast the polymer formed in **Reaction 5** to the polymer formed in **Reaction 3**. In your answer you should explain why the polymers formed in these two reactions are different. 

ANSWER		
1. Identify the **monomer**, then draw the **polymer** (**identify C 1 and C2** in monomer either side of the double bond then draw a chain of C (4 for 2 repeating units) and add on groups of each one **removing double bond**)	monomer reaction 5 C1 C2 CH_3-CH_2-CH_2-CH=CH$_2$ reaction 3 CH_3-CH_2-CH=CH-CH_3	polymer C1 C2 C1 C2 H H H H —C—C—C—C— C_3H_7 H C_3H_7 H
2. explain the definition of **addition polymerisation**	Since the monomer for this reaction is an alkene, when polymerisation occurs, the double bond in each alkene molecule is broken, freeing up a bonding space on each of the C atoms that was part of the double bond. This allows the monomers to join together by forming covalent bonds to make the polymer. Since double bonds in the alkene are being broken and molecules added into the freed up bonding spaces to make the monomer, this is an **addition reaction**. **Polymerisation** reactions occur when many monomers are chemically joined.	
3. **molecule 1** (reaction 5) – describe the 2 groups of each end of the double bonded carbons	In **Reaction 3**, the polymer formed will have a carbon with one hydrogen and a methyl group, and a carbon with one hydrogen and an ethyl group, as its repeating unit, due to the **double bond being on the C2 position**.	
4. **molecule 2** (reaction 3) – describe the 2 groups of each end of the double bonded carbons	In **Reaction 5**, since the **double bond** is in a different position (**the C1 position**), the polymer formed will have as its repeating unit a carbon atom with 2 hydrogen atoms attached, and a carbon atom with one hydrogen attached and a propyl group attached.	
5. Explain that molecule 1 and 2 are **structural isomers** but have the same molecular formula	The molecular formulae of the two repeating units of both polymers are the same, but the structural formulae are different. (States repeating units are structural isomers.)	

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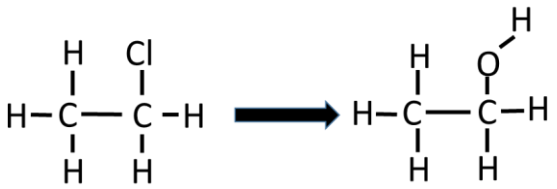
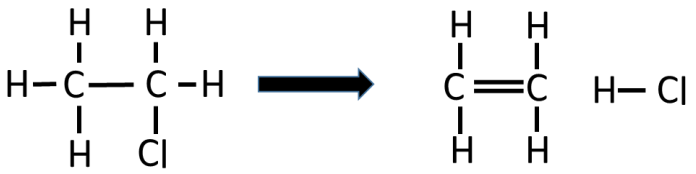
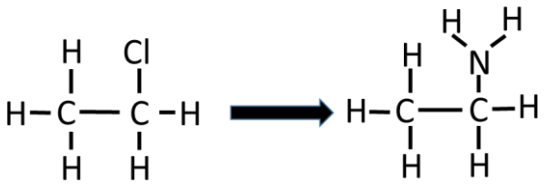
Writing Excellence answers to **Haloalkane reactions** questions

Haloalkane reactions QUESTION
Question: Chloroethane, CH_3CH_2Cl, reacts with aqueous KOH, alcoholic KOH, and with NH_3. Compare and contrast the reactions of chloroethane with the three reagents. In your answer you should include: • the type of reaction occurring and the reason why it is classified as that type • the type of functional group formed • equations showing structural formulae for reactions occurring.

ANSWER	
Reaction 1 Chloroethane reacts with $KOH_{(aq)}$	**Product formed -** forms an alcohol, ethanol
	Reaction type - in a substitution reaction; Cl is replaced by OH.
	Condensed Structural Formula equation $CH_3CH_2Cl \rightarrow CH_3CH_2OH$
	Structural Formula equation 
Reaction 2 Chloroethane reacts with $KOH_{(alc)}$	**Product formed -** forms an alkene, ethane (plus a HCl molecule)
	Reaction type - in an elimination reaction; H and Cl removed / HCl formed.
	Condensed Structural Formula equation $CH_3CH_2Cl \rightarrow CH_2 = CH_2 + HCl$
	Structural Formula equation 
Reaction 3 Chloroethane reacts with $NH_{3(alc)}$	**Product formed -** forms an amine, aminoethane
	Reaction type - in a substitution reaction; Cl is replaced by NH_2
	Condensed Structural Formula equation $CH_3CH_2Cl \rightarrow CH_3CH_2NH_2$
	Structural Formula equation 

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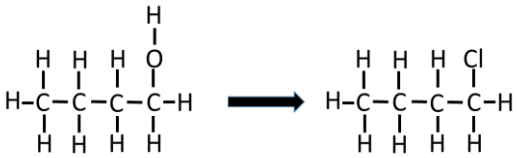
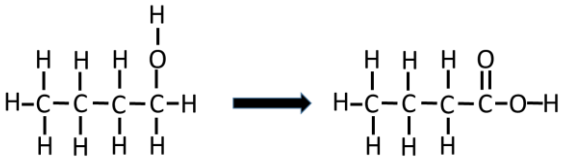
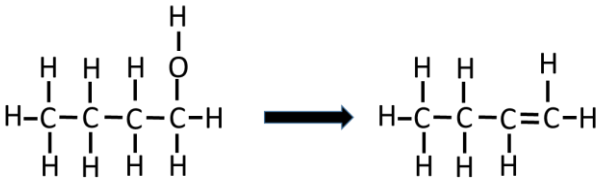
Writing Excellence answers to **Alcohol Reactions** questions

Alcohol Reactions QUESTION
Question: Butan-1-ol can react separately with each of PCl_5, $Cr_2O_7^{2-}$ / H^+, and concentrated H_2SO_4. Elaborate on the reactions of butan-1-ol with each of the three reagents. For each reaction, your answer should include: • the type of reaction occurring and the reason why it is classified as that type • the name of the functional group formed in each product • the structural formula of the **organic** product.

ANSWER	
Reaction 1 Butan-1-ol reacts with PCl_5	**Product formed** – The functional group in the product is a chloro group / chloroalkane (haloalkane) 1-chlorobutane
	Reaction type - Reaction with PCl_5 is a **substitution** reaction. The hydroxyl group (–OH) is replaced by a chloro group (–Cl).
	Condensed Structural Formula equation $CH_3CH_2CH_2CH_2OH \rightarrow CH_3CH_2CH_2CH_2Cl$
	Structural Formula equation 
Reaction 2 Butan-1-ol reacts with $Cr_2O_7^{2-}$ / H^+	**Product formed** - The functional group in the product is carboxylic acid. butanoic acid
	Reaction type – Reaction with acidified dichromate is **oxidation** as the alcohol is oxidised to a carboxylic acid.
	Condensed Structural Formula equation $CH_3CH_2CH_2CH_2OH \rightarrow CH_3CH_2CH_2COOH$
	Structural Formula equation 
Reaction 3 Butan-1-ol reacts with concentrated H_2SO_4	**Product formed** - The functional group in the product is a (carbon-to-carbon) double bond / alkene. But-1-ene
	Reaction type - Reaction with concentrated H_2SO_4 is an **elimination** reaction. A hydrogen atom and the –OH group on (adjacent) carbon atoms are removed forming a (carbon-to-carbon) double bond.
	Condensed Structural Formula equation $CH_3CH_2CH_2CH_2OH \rightarrow CH_3CH_2CH{=}CH_2$
	Structural Formula equation 

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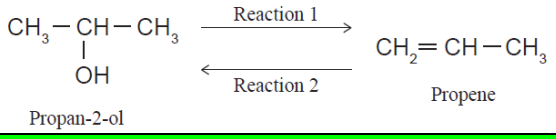
Writing Excellence answers to **Alkene Reactions** questions

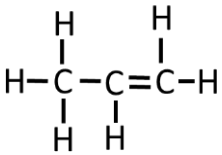
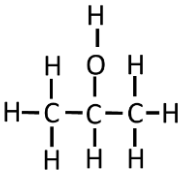
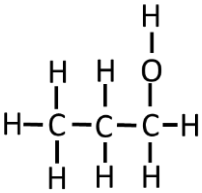
Alkene Reactions QUESTION	
Question: Ethene, $C_2H_{4(g)}$, reacts with aqueous potassium permanganate solution, **$KMnO_{4(aq)}$**, dilute acid, **H_2O / H^+**, and hydrogen bromide, **HBr.** Compare and contrast the reactions of ethene gas with each of these three reagents. In your answer, you should: • describe any observations that can be made • identify, with reasons, the type of reaction ethene undergoes with each reagent • describe the functional group of the products formed • include equations showing the structural formulae for the organic compounds for each reaction.	
ANSWER	
Reaction 1 Ethene, $C_2H_{4(g)}$ *reacts with* aqueous potassium permanganate solution, **$KMnO_{4(aq)}$**,	**Observations** - The purple $KMnO_4$ turns colourless (or brown)
	Reaction type - This is an **oxidation or addition** reaction in which the double bond is broken and two –OH groups attach to each C atom of the double bond.
	Functional group of products Ethene reacts with aqueous $KMnO_4$ to form a diol, ethan-1,2-diol.
	Structural Formula equation $CH_2{=}CH_2 \xrightarrow{KMnO_4} CH_2(OH)-CH_2(OH)$
Reaction 2 Ethene, $C_2H_{4(g)}$ *reacts with* dilute acid, **H_2O / H^+**	**Observations** - No colour changes are observed in this reaction. (colourless to colourless)
	Reaction type -This is an **addition** reaction as once again the double bond is broken. However, in this reaction one –OH group and one –H atom attach to each C atom of the double bond.
	Functional group of products Ethene reacts with dilute acid, H_2O / H^+, to form ethanol.
	Structural Formula equation $CH_2{=}CH_2 \xrightarrow{H_2O/H^+} CH_3-CH_2-OH$
Reaction 3 Ethene, $C_2H_{4(g)}$ *reacts with* hydrogen bromide, **HBr.**	**Observations** - Again there is no colour change observed. (colourless to colourless)
	Reaction type - This reaction is an **addition** reaction, as the double bond is broken and two atoms are added to each C atom of the double bond. In this reaction one H and one Br atom are added.
	Functional group of products When ethene reacts with hydrogen bromide, bromoethane is formed.
	Structural Formula equation $CH_2{=}CH_2 \xrightarrow{HBr} CH_3-CH_2-Br$
Summary of the three reactions	All three reactions involve the breaking of the double bond. All three reactions involve addition (adding atoms on) Two of these reactions are addition reactions and one is an oxidation reaction. Only one of the reactions gives a colour change that is easily observed.

NOTE: The white column is how your answer would appear on your test paper so make sure you **write out complete sentences**. The grey area is just to help you structure your answer and would not appear in the question.

Chemistry 2.5 AS 91165 Demonstrate understanding of the properties of selected organic compounds

Writing Excellence answers to **Major and Minor products** questions

Major and Minor Products QUESTION
Question: In Reaction 1, propan-2-ol can be converted to propene. In Reaction 2, propene can be converted back to propan-2-ol. Analyse BOTH of these reactions by: ❑ describing the reagents and conditions needed for each reaction to occur ❑ identifying each type of reaction and explaining your choice ❑ explaining why Reaction 1 forms only a single organic product, but Reaction 2 forms a mixture of organic products. 

ANSWER	
1. Reaction 1 Propan – 2-ol forms propene	**Reagent and conditions** -To convert propan-2-ol to propene, add concentrated sulfuric acid (which is a dehydrating agent).
	Reaction type - It is an elimination reaction because OH and H are removed from adjacent carbon atoms and a double bond is created to form an alkene.
	Structural Formula 
2. Reaction 2 Propene forms propanol Label each structure with name and whether it is major or minor	**Reagent type and conditions** - To convert propene to propan-2-ol, add dilute (sulfuric) acid.
	Reaction type - This is an addition reaction because the double bond is broken forming a C-C (single) bond, allowing H and OH from water to bond to the C atoms that were double bonded together.
	Structural Formula  **Product type:** Major **Name:** Propan-2-ol  **Product type:** Minor **Name:** Propan-1-ol
3. Explain why <u>reaction one</u> forms only **one product** linked to symmetry	Reaction 1 forms only one product because the carbon atom from which the H is removed (C1 or C3) does not affect the structure of the product as **propan-2-ol is symmetrical.**
4. State Markovnikov's rule **AND** Explain the reason <u>reaction two</u> produces **two products** linked to Markovnikov's rule and asymmetry, including which is major and which is minor.	Reaction 2 produces two products because an **asymmetric reagent** (H-OH) adds onto an **asymmetric alkene** ($CH_3CH=CH_2$). There are two carbons that the H or OH can bond with (C1 and C2), so there are **two possible combinations**. We can predict which will be the major product by using <u>Markovnikov's rule</u>, which states that the **carbon with the most hydrogens gains more hydrogens**. This means that most of the time, C1 will get another hydrogen while C2 will get the OH in this reaction. Propan-2-ol will be the major product and propan-1-ol the minor product.

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Chemistry 2.5 AS 91165 Demonstrate understanding of the properties of selected organic compounds

Writing Excellence answers to **Identifying Unknowns** questions

Identifying Unknowns QUESTION
Question: Question: 1c: Four separate colourless organic liquids are known to be: • ethanol • ethanoic acid • hex-2-ene • 1-aminohexane Write a procedure to identify each of these organic liquids using **only** the reagents listed below. • acidified dichromate solution, $Cr_2O_7^{2-}$ / $H^+_{(aq)}$ • bromine water, $Br_{2(aq)}$ • sodium carbonate solution, $Na_2CO_{3(aq)}$. In your answer, you should: • identify the test reagents used • describe any observations that would be made • identify the type of reaction that occurs • identify the organic product of any reaction. You do not need to include equations in your answer.

ANSWER	
Step 1	**Test reagents used –** start with $Cr_2O_7^{2-}$ / H^+ adding a bit to each sample
	Observations - which will turn from **orange to green** with ethanol No change for the other 3 samples
	Type of reaction that occurs - oxidation
	Organic product of any reaction - ethanol is oxidised to ethanoic acid.
Step 2	**Test reagents used -** add sodium carbonate solution, $Na_2CO_{3(aq)}$. to the remaining 3 samples
	Observations - Bubbles of gas will be produced in the ethanoic acid sample No change for the other 2 samples
	Type of reaction that occurs – acid-base reaction
	Organic product of any reaction – in the acid-base reaction Sodium ethanoate / ethanoate ion is formed.
Step 3.	**Test reagents used** – add bromine water, $Br_{2(aq)}$ to the remaining 2 samples
	Observations - the bromine water, which turns from red / brown to colourless straightaway in the hex-2-ene sample No change for the other sample (for substitution in an alkane this reaction will be seen slowly with UV light as a catalyst)
	Type of reaction that occurs – addition reaction
	Organic product of any reaction – in the addition reaction It will form 2,3-dibromohexane is formed
Step 4.	**Test reagents used** - Hexan-1-amine will be the chemical left over that will not react with any of the given reagents.
	Observations (in other questions red litmus paper can be used – which will turn blue for an amine)
	Type of reaction that occurs
	Organic product of any reaction

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NCEA L2 Chemistry Organic Scheme