

Assignment: Naming Organic Compounds

Answers

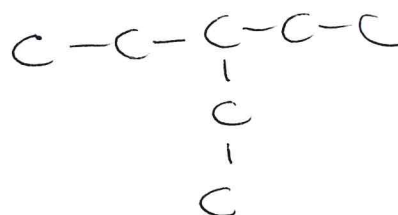
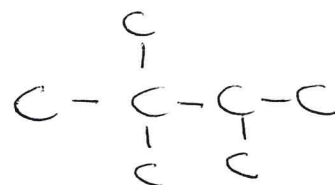
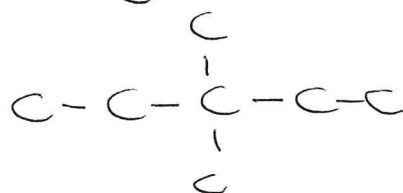
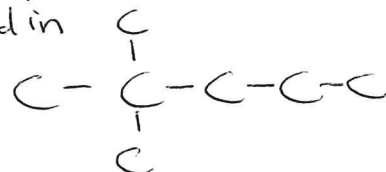
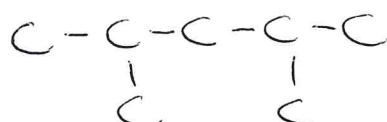
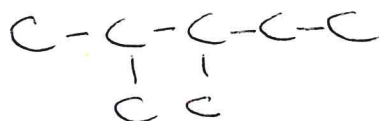
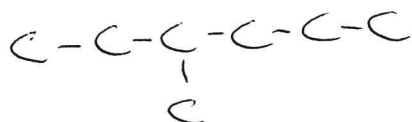
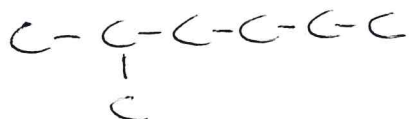
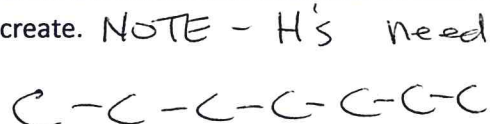
1. Name the following alkanes:

a) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ Pentane	b) $\begin{array}{c} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 \\ \\ \text{CH}_3 \end{array}$ butane
c) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ 1 \quad 2 \quad 3 \quad 4 \end{array}$ 2-methylbutane	d) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$ (2,2)-dimethylpropane #s not necessary
e) $\begin{array}{c} \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{CH} - \text{CH} - \text{CH} - \text{CH}_3 \\ 7 \quad 3 \quad 6 \quad 5 \quad 4 \quad 3 \quad 2 \quad 1 \\ \quad \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$ 3-ethyl-2,5-dimethylheptane	f) $\begin{array}{c} \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH} - \text{CH} - \text{CH}_3 \\ 15 \quad 4 \quad 3 \quad 2 \quad 1 \\ \quad \quad \\ \text{CH}_2 \quad \text{CH}_3 \\ \\ \text{CH}_3 \end{array}$ 3-ethyl-2,5-dimethylheptane
g) $\begin{array}{c} \text{CH}_3 \quad \quad \text{CH}_3 \\ \quad \quad \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{C} - \text{CH}_2 - \text{CH}_3 \\ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \\ \quad \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$ 2,2,4,4-tetramethylhexane	h) $\begin{array}{c} \text{CH}_2 - \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{CH}_3 \\ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \\ \quad \quad \\ \text{CH}_3 \quad \text{CH}_2 - \text{CH}_2 - \text{CH}_3 \end{array}$ 6-ethyl-2-methyl-4-propyloctane
i) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_2 - \text{CH}_2 - \text{CH}_2 \\ \\ \text{CH}_3 \end{array}$ Pentane	j) $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{CH} - \text{CH}_2 - \text{CH}_2 \\ 9 \quad 8 \quad 7 \quad 6 \quad 5 \quad 4 \\ \quad \quad \\ \text{CH}_3 \quad \text{CH}_3 \end{array}$ 2,6,7-trimethylnonane

2. Draw the condensed structural formulas (as in question #1) for the following alkanes.

2,3-dimethylpentane $\begin{array}{ccccccc} \text{CH}_3 & - & \text{CH} & - & \text{CH} & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & \\ & & \text{CH}_3 & & \text{CH}_3 & & & & \end{array}$	3-ethylhexane $\begin{array}{ccccccc} \text{CH}_3 & - & \text{CH}_2 & - & \text{CH} & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & & & \\ & & & & \text{CH}_2 & - & \text{CH}_3 & & & & \end{array}$
³/4-ethyl-3,4-dimethylhexane $\begin{array}{ccccccc} & & \text{CH}_3 & & \text{CH}_3 & & \\ & & & & & & \\ \text{CH}_3 & - & \text{CH}_2 & - & \text{C} & - & \text{CH} & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & & & \\ & & & & \text{CH}_2 & - & \text{CH}_3 & & & & \end{array}$	butane $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$
4-propyloctane $\begin{array}{ccccccc} \text{CH}_3 & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH} & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & & & & & & \\ & & & & & & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_3 & & & \end{array}$	3-ethyl-2-methyl-5-propyl decane $\begin{array}{ccccccc} & & \text{CH}_3 & & & & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & & & \\ \text{CH}_3 & - & \text{CH} & - & \text{CH} & - & \text{CH}_2 & - & \text{CH} & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_2 & - & \text{CH}_3 \\ & & & & & & & & & & & & & & & \\ & & & & & & \text{CH}_2 & - & \text{CH}_3 & & & & & & & \end{array}$

3. Draw the condensed structural formulas for all of the isomers of heptane. Name each of the compounds you create. NOTE - H's need to be added in



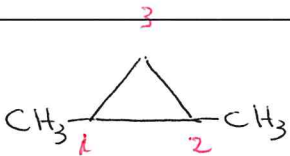
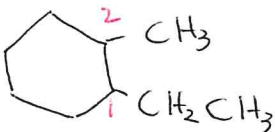
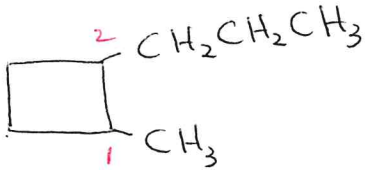
4. Name the following alkenes and alkynes.

$\overset{1}{\text{CH}_3}-\overset{2}{\text{CH}_2}-\overset{3}{\text{CH}}=\overset{4}{\text{CH}}-\overset{5}{\text{CH}_2}-\overset{6}{\text{CH}_3}$ 3-hexene	oops! Draw 3-propyl-2-heptene $\text{CH}_3-\text{CH}=\underset{\text{CH}_2\text{CH}_2\text{CH}_3}{\text{C}}-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$
$\overset{4}{\text{CH}_3}-\overset{3}{\underset{\text{CH}_3}{\text{CH}}}-\overset{2}{\text{CH}}=\overset{1}{\text{CH}_2}$ 3-methyl-1-butene	$\text{CH}_3-\underset{\text{CH}_2}{\underset{\text{CH}_3}{\text{CH}}}-\overset{3}{\text{C}}\equiv\overset{2}{\text{C}}-\overset{1}{\text{CH}_3}$ 4-methyl-2-hexene
$\overset{1}{\text{CH}_2}=\overset{2}{\text{CH}}-\overset{3}{\text{CH}}=\overset{4}{\text{CH}_2}$ 1,3-butadiene	$\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\overset{3}{\underset{\text{CH}_3}{\text{CH}}}-\overset{4}{\text{C}}(\text{CH}_3)=\text{CH}-\text{CH}_2-\text{CH}_3$ 4-ethyl-2,3-dimethyl-4-octene
$\overset{4}{\text{CH}_3}-\overset{3}{\text{C}}\equiv\overset{2}{\text{C}}(\text{CH}_3)-\overset{1}{\text{CH}_3}$ 2-methyl-2-butene	$\text{CH}_3-\text{C}\equiv\text{C}-\underset{\text{CH}_3}{\text{CH}}-\text{CH}_3$ 4-methyl-2-pentyne

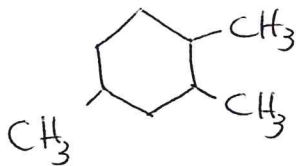
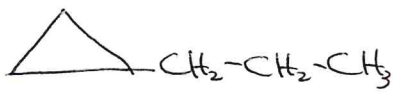
5. Draw condensed structural diagrams for the following alkenes and alkynes.

2,4-dimethyl-3-hexene $\text{CH}_3-\underset{\text{CH}_3}{\text{CH}}-\text{CH}=\underset{\text{CH}_3}{\text{C}}-\text{CH}_2\text{CH}_3$	5-ethyl-4-propyl-2-heptyne $\text{CH}_3-\text{C}\equiv\text{C}-\underset{\text{CH}_2\text{CH}_2\text{CH}_3}{\text{CH}}-\underset{\text{CH}_2\text{CH}_2\text{CH}_3}{\text{CH}}-\text{CH}_2\text{CH}_3$
2-methyl-1,3-butadiene $\text{CH}_2=\underset{\text{CH}_3}{\text{C}}-\text{CH}=\text{CH}_2$	3-ethyl-1-hexyne $\text{CH}\equiv\text{C}-\underset{\text{CH}_2\text{CH}_3}{\text{CH}}-\text{CH}_2\text{CH}_2\text{CH}_3$

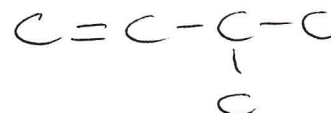
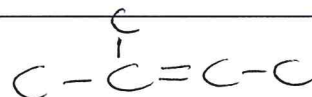
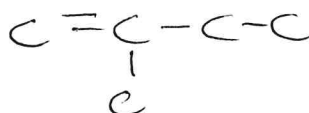
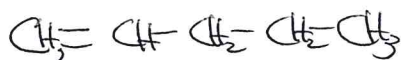
6. Name the following cycloalkanes.

 Cyclopentane	 1,2-dimethylcyclopropane
 1-ethyl-2-methylcyclohexane	 Methylcyclobutane
 1-methyl-2-propylcyclobutane	 Cyclopropylcyclopentane

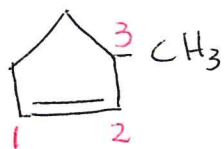
7. Draw the condensed structural formula for the following cycloalkanes.

1,2,4-cyclotrimethylcyclohexane 	propylcyclopropane 
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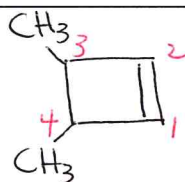
8. Draw all of the isomers of cyclopentane. Name each of the isomers.



9. Names the following cycloalkenes.



3-methyl-1-cyclopentene

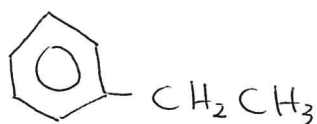


3,4-dimethyl-1-cyclobutene

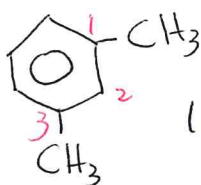
10. Name the following aromatic hydrocarbons.



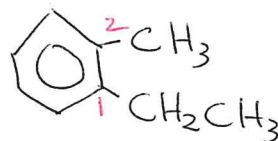
benzene



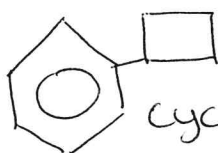
ethylbenzene



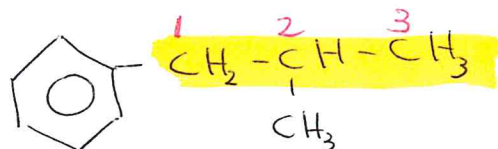
1,3-dimethylbenzene



1-ethyl-2-methylbenzene



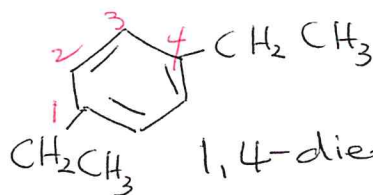
cyclobutylbenzene



2-methyl-1-phenylpropane

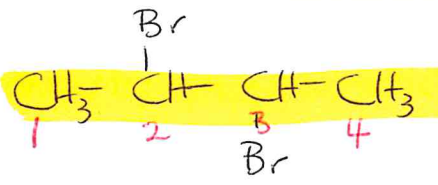
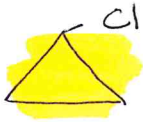
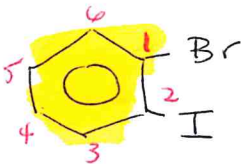
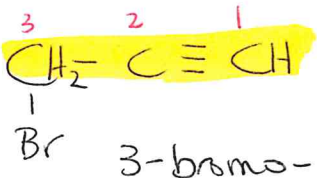
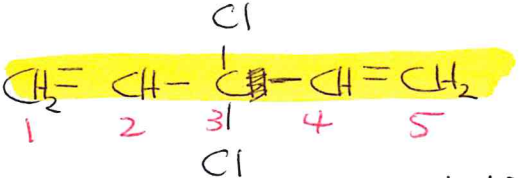
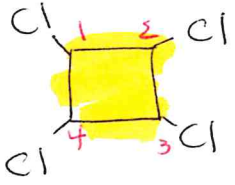
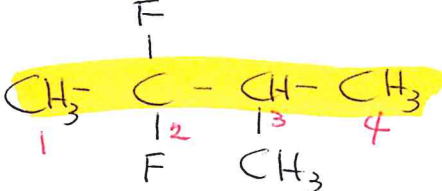


3-phenyl-1-propene

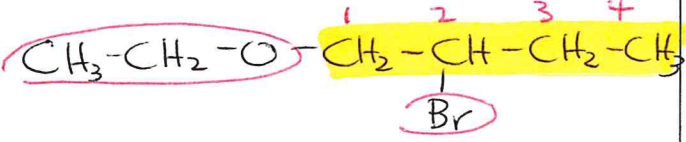
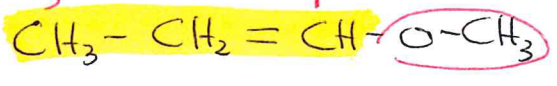


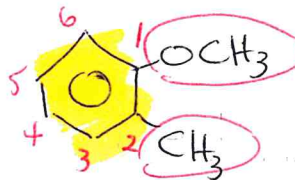
1,4-diethylbenzene

11. Name the following alkyl halides.

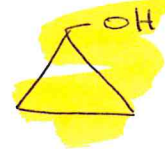
 2,3-dibromobutane	$\text{C} - \text{C} = \text{C} - \text{C} - \text{C}$ omit
 Chlorocyclopropane	 1-bromo-2-iodobenzene
 3-bromo-1-propyne	 3,3-dichloro-1,4-pentadiene
 1,2,3,4-tetrachlorocyclobutane	 2,2-difluoro-3-methylbutane

12. Name the following ethers.

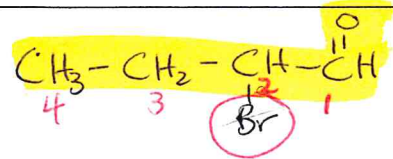
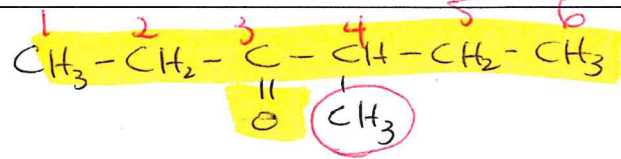
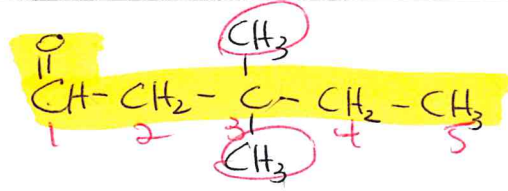
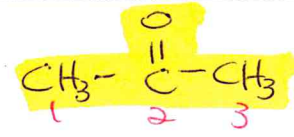
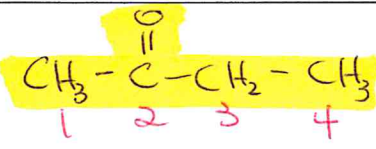
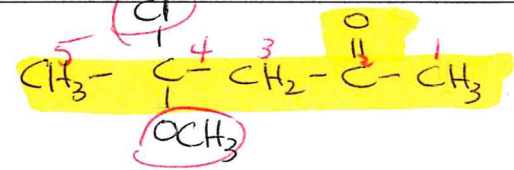
 1-ethoxypropane	 2-bromo-1-ethoxybutane
 Methoxycyclopropane	 1-methoxy-1-propene

 1-methoxy-2-methylbenzene	$\text{CH} \equiv \text{C} - \text{O} - \text{CH}_3$ methoxy ethyne
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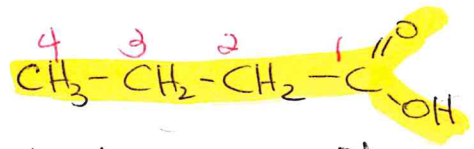
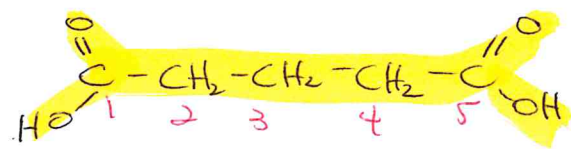
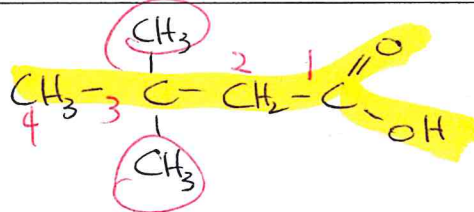
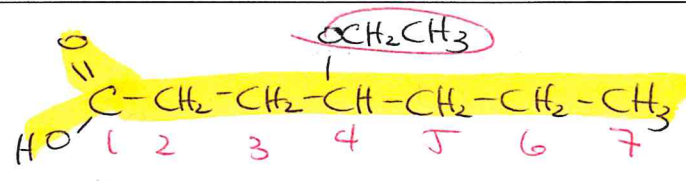
13. Name the following alcohols.

$\text{CH}_3 - \underset{\text{OH}}{\text{CH}} - \text{CH}_2 - \text{CH}_3$ 2-butanol	 cyclopropanol
$\text{CH}_3 - \underset{\text{OH}}{\underset{\text{OH}}{\text{C}}} - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ 2,2-pentandiol	$\text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$ 5-fluoro-2-pentanol
 phenol	$\text{CH}_3 - \text{CH}_2 - \underset{\text{OH}}{\text{CH}} - \text{CH}_2 - \underset{\text{OCH}_3}{\text{CH}} - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$ 5-methoxy-6-methyl-3-heptanol

14. Name the following aldehydes and ketones.

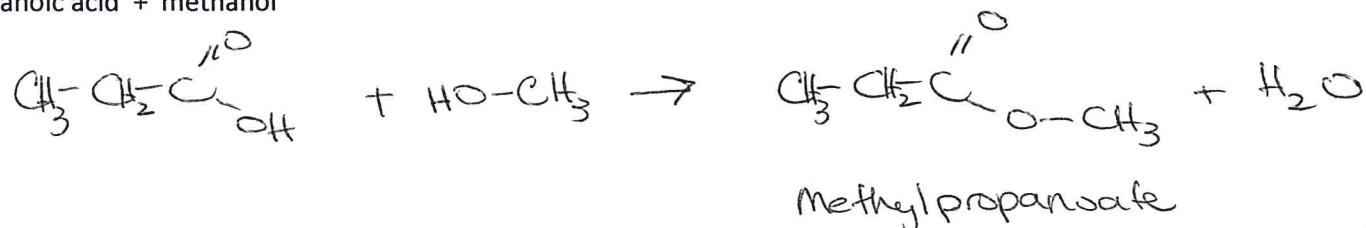
 2-bromobutanal	 4-methyl-3-hexanone
 3,3-dimethylpentanal	 propanone
 (2)-butanone.	 4-chloro-4-methoxy-2-pentanone

15. Name the following carboxylic acids.

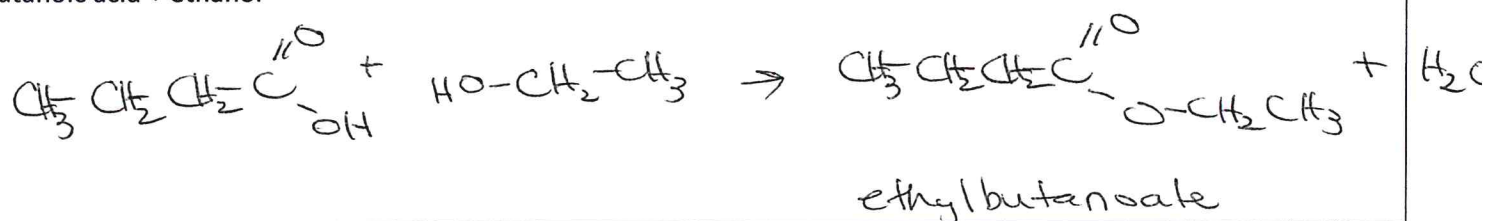
 butanoic acid	 pentandioic acid
 3,3-dimethylbutanoic acid	 4-ethoxyheptanoic acid

16. Create the ester that forms when the following carboxylic acids and alcohols react. Name the ester.

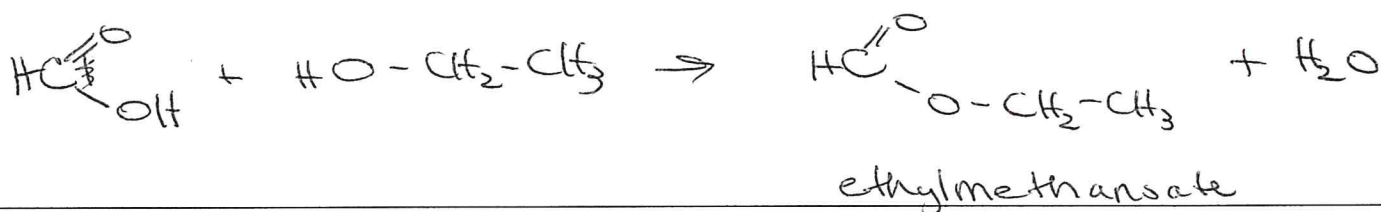
Propanoic acid + methanol



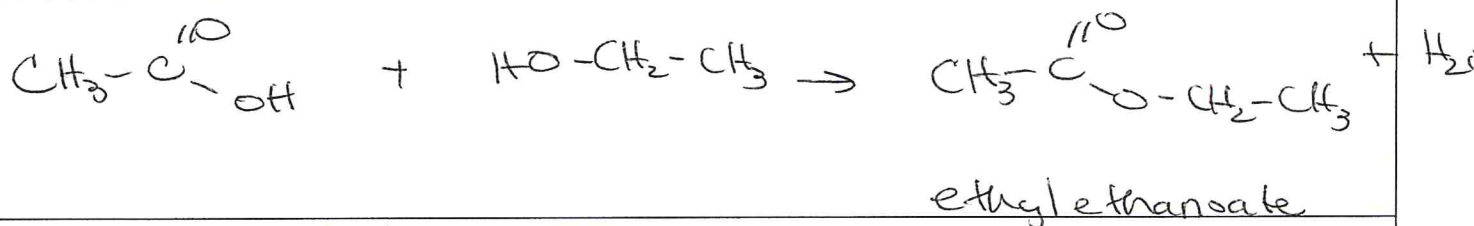
Butanoic acid + ethanol



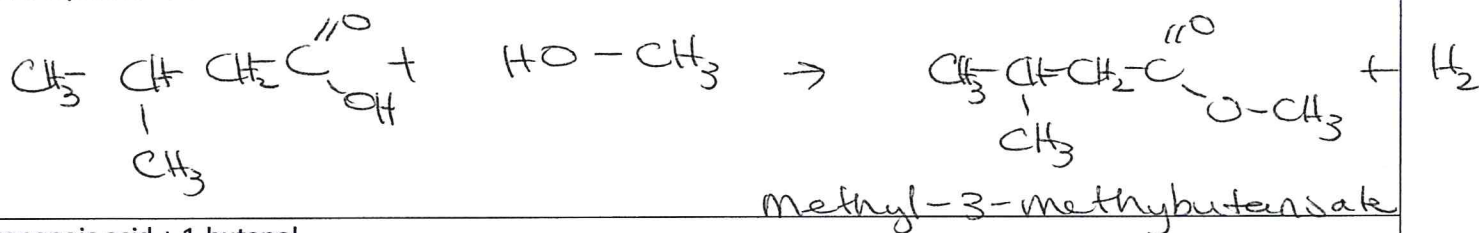
Methanoic acid + ethanol



Ethanoic acid + ethanol



3-methyl butanoic acid + methanol



Propanoic acid + 1-butanol

