

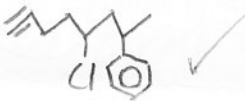
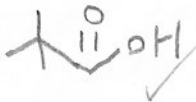
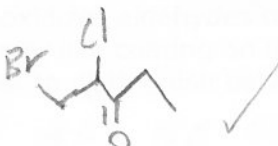
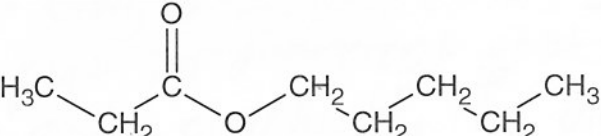
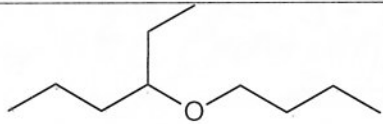
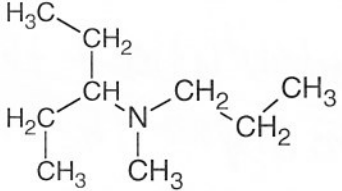
Part A: Knowledge and Understanding

- Multiple choice: please place all of your answers on your scantron card in pencil. (14 marks K)
- Identify the organic compound that best matches the description/property below: (4 marks K)

Property/Example	Type of Organic Molecule
Have been used as anesthetics and are very flammable. ether LMAO →	Alcohols x (technically correct)
Short chains have pungent odours, but become more pleasant as the chain gets longer.	Esters x
This type of organic molecule can turn litmus paper red.	carboxylic acids ✓
This type of organic compound is used to make paraffin wax candles.	alkanes ✓ (2)

Part B – Communication

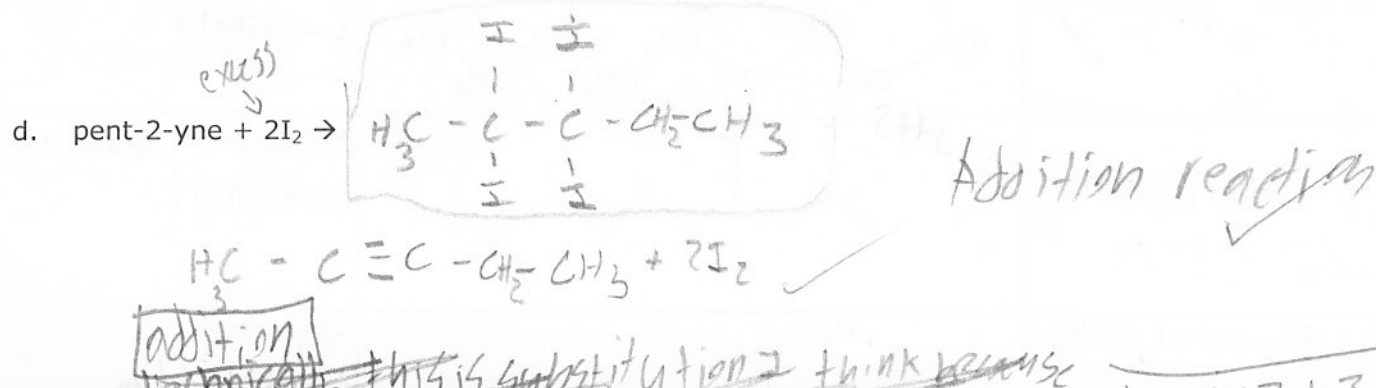
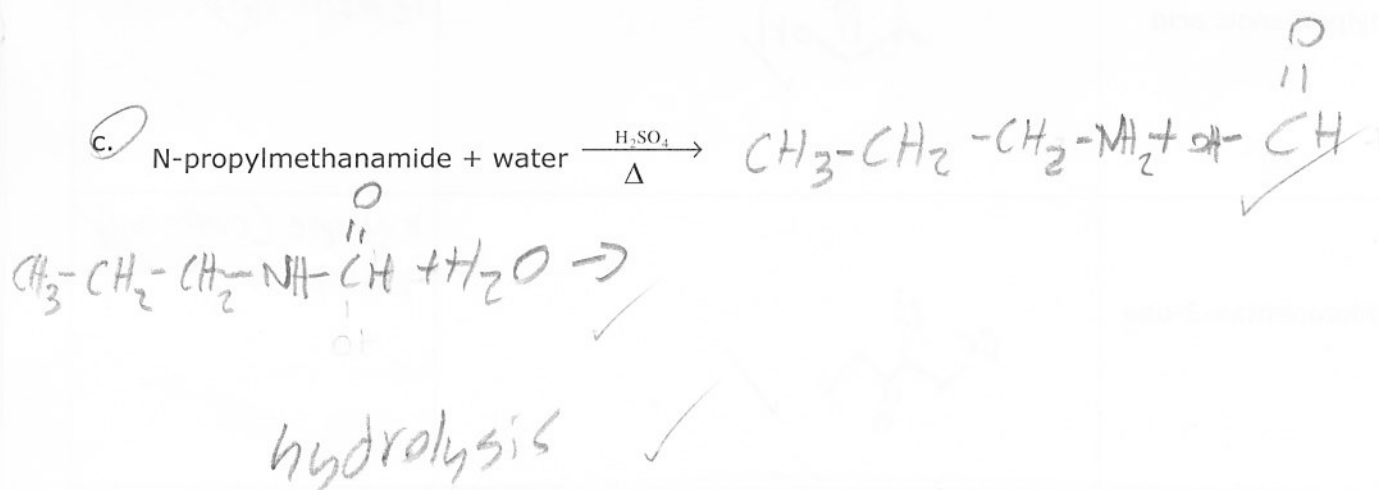
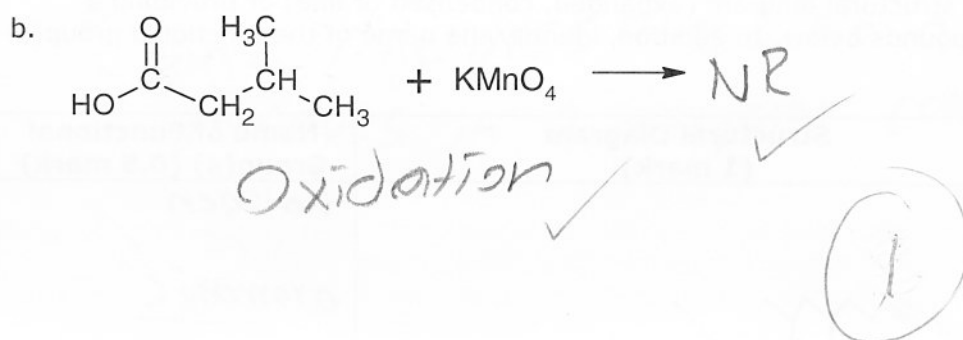
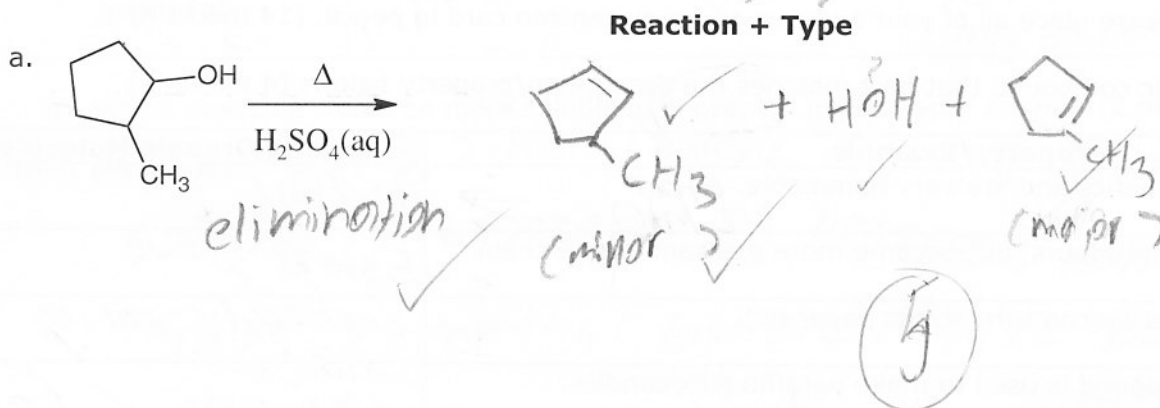
- Complete the table by drawing a structural diagram (expanded, condensed or line) or providing a correct IUPAC name for the compounds below. In addition, identify the name of the functional group(s) present. (15 marks C)

Name (1 mark)	Structural Diagram (1 mark)	Name of Functional Group(s) (0.5 mark)
5-chloro-7-phenyloct-1-yne		halogen alkene aromatic ✓
2,2-dimethylpropanoic acid		carboxylic acid (carboxyl) ✓
1-bromo-2-chloropentan-3-one		ketone (carbonyl) halogen
pentyl propanoate ✓		ester linkage (carbonyl)
butoxy ethyl butane x		ether - linkage (carbonyl)
N-methyl-N-propyl pentan-3-amine 3-amine		amine (amino) ✓

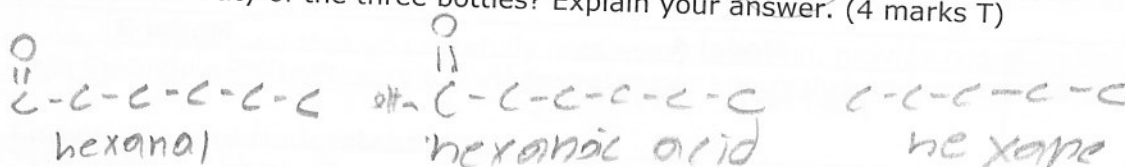
4. Complete each of the following reactions by: (13 marks T)

- Drawing a structural diagram for all products produced (if possible), indicating major and minor products when necessary.
- Identifying the type of reaction. If there is no reaction possible, write NR for the products.

*Please note: you DO NOT need to name any reactants or products.



5. The labels have fallen off three bottles of organic compounds. The labels indicate that the contents of the bottles are hexanal, hexanoic acid and hexane. What physical test(s) could you perform to determine the identity of the three bottles? Explain your answer. (4 marks T)



Hexane would be less soluble in water than the other 2 compounds due to its low polarity. If you dissolved them all in water hexane would not dissolve.

Chemical test
To determine between hexanal and hexanoic acid, hexanoic acid would turn litmus paper red as it is acidic.

Another test for all of them is to test boiling points. Acids should theoretically have a higher boiling point than aldehydes and aldehydes should have a higher boiling point than alkanes due to molar masses and stronger intermolecular forces like di-pole dipole and H-bonding.

Part D: Application

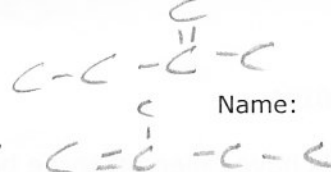
6. Tetrachloroethene, sometimes called perchloroethylene, is the most commonly used dry cleaning solvent. Dry cleaning involves the washing of clothes in the liquid solvent to remove non-polar fats and oils and then distilling the solvent to recover it. Why would tetrachloroethene be used instead of ethanol, which has the same number of carbons, is less expensive, and has lower toxicity? (3 marks A)

Ethanol is an alcohol and this has some polarity to it. Alcohols are polar while alkenes less so. The non polar alkene tetrachloroethene will cause non polar fats and oils to dissolve while polar solvents like ethanol will only dissolve polar compounds.

7. Tollen's Reagent is a chemical that oxidizes aldehydes to produce a carboxylic acid. At the same time, silver ions in the reagent form a mirror like coating on the test tube where the reaction is occurring. How does this reagent work as a test to distinguish between aldehydes and ketones? (3 marks A)

This works as a test as ketones cannot oxidize into carboxylic acids only aldehydes can. So if two compounds are put in different test tubes with the reagent, 1 ketone and 1 aldehyde, the aldehyde's tube would gain a mirror like coating while the ketone

8. Examine the two 3D molecules to answer the questions that follow.



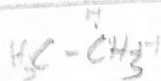
Name:

a) Provide a correct name for each molecule and identify the functional group(s) present. (4 marks A)

	Model A	Model B
Name of Molecule	methyl ethanoate	2-methyl butene (4)
Type of functional group(s)	ester ✓	no functional groups only double bond ether ✓

b) Which molecule would be more soluble in benzene? Explain your answer. (2 marks A)

The Model B, 2-methyl butene is soluble in benzene as benzene is non polar and so is 2-methyl butene they're both non polar because they both lack any other atoms besides carbon-hydrogen and carbon-carbon bonds. Since like dissolve like a non polar compound dissolves in a non polar compound. (2)



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