Sample Assignment: Unit 10 Synthesising Organic Chemicals

ASSIGNMENT BRIEF

Unit Name:	Synthesising Organic Chemicals	**Unit Number:**	10
Assignment Title:	The Importance of Functional Groups and Isomerism in Organic Molecules	**Assignment Number:**	10.1a
Date Set:		**Due Date:**	
Assessment Objective(s): AO1a			

Brief:

The presence of functional groups within organic molecules determines the physical and chemical properties of the compound. Although organic compounds may have the same molecular formula as other compounds, it is the order in which these atoms are bonded together that may give an isomer completely different reactions and physical properties. This is a vitally important feature of drug design and action.

In this assignment you will present a report showing that you understand and can correctly identify functional groups in some chosen compounds and link to particular isomers and their industrial and commercial importance.

Assignment:

During your work for this unit you will have studied a number of aliphatic and aromatic compounds and learnt to recognise the functional groups present.

You are given the names of several organic compounds. For each compound you are required to write their displayed formulae and to give the displayed formula of an isomer or isomers of each compound which has, or have, a different functional group present.

For compounds (i) to (v) you should state a use for the compound listed.

Your answers should be in the form of a brief report in which your answers are presented in an appropriate and methodical way.

(i) Ethanol

(ii) Propanone

(iii) Ethyl ethanoate

(iv) Propene

(v) 4-aminobenzenecarboxylic acid

(vi) 4-methylbenzenecarboxylic acid.

Maximum marks possible for this task: 3

Resources:

Class notes on practical organic chemistry and relevant paper and computer-based material.

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ASSIGNMENT BRIEF

Unit Name:	Synthesising Organic Chemicals	**Unit Number:**	10
Assignment Title:	Recognising Different Types of Reaction in Organic Chemistry	**Assignment Number:**	10.1b
Date Set:		**Due Date:**	
Assessment Objective(s): AO1b			

Brief:

Organic chemists in industry use well defined reaction routes when setting out to synthesise new materials. One of the main tools of the chemist is the understanding of different reaction types which can lead to prediction of new and improved chemical compounds.

During your work for this unit you will have studied the various reaction types listed. You are given a number of reactions and asked to identify the reaction type and any missing compound(s) as appropriate.

Assignment:

You are given a number of reactions with details missing. In each case fill in the missing information as appropriate. The first one is done as an example.

Maximum marks possible for this task: 2

Resources:

Class notes on practical organic chemistry and relevant paper and 'electronic'-based material

1 $CH_3Br + NaOH \rightarrow CH_3OH + NaBr$

Type of reaction: *Substitution*

Functional group present in organic product: *Alcohol*

2 $CH_2 = CH_2 + Br_2 \rightarrow$ _____

Type of reaction:.....

Name of product: *1,2-dibromoethane*

Formula of product needed in the equation:

.....

3 $CH_3COOCH_3 +$ _____ $\rightarrow CH_3COOCH + CH_3OH$

Type of reaction: *Hydrolysis*

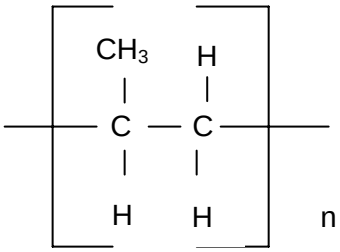
Name of organic reactant:.....

Formula of the other reactant needed in the equation:

.....

Names of organic products: .....and.....

4 n $CH_3CH=CH_2$ ⟶



Type of reaction: .....

Name of reactant: .....

Functional group present in reactant: .....

5 CH_3CH_2OH + acidified potassium dichromate $\rightarrow$ CH_3CHO

Type of reaction:.....

Name of organic product: .....

Formula of *functional group* present in organic product:

.....

6 $CH_3CH_2CH_2Br$ + KCN $\rightarrow$ $CH_3CH_2CH_2CN$ + _____

Type of reaction:.....

Formula of the other product needed in the equation:

.....

7 $C_6H_5NH_2$ _____ $\rightarrow$ _____

Type of reaction: *Diazotisation*

Conditions:.....

Reagents: *Sodium nitrite/hydrochloric acid followed by phenol*

Formula of the organic product required in this unbalanced equation:

.....

8 C_6H_5COOH + $\rightarrow CH_3OH$ $\rightarrow$ _____ + _____

Formula of the two products needed in the equation:

.....and.....

Type of reaction: *Esterification*

Catalyst:.....

Note: This assignment is just a suggestion of how this topic could be addressed. In order to reach higher MB3, additional work needs to be added to this basic task.

e.g. For MB3, assignment needs to include additional explanation of reaction types with less directed work. The student could introduce his/her own examples.