# **Worksheet 48**

3,3,4-trimethy/pentanal

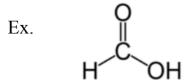
# **Carboxylic Acids**

<u>Carboxylic Acid</u> - contain a carbonyl and a hydroxyl functional group together (**carboxyl group**)

- small carboxylic acids mix with water but large carboxylic acids do
- give a positive litmus test (blue to red).

#### **Naming**

- carboxylic acids are named by replacing the "e" in the alkane name by <u>oic</u> and adding <u>acid</u>.
- compounds with more than one carboxyl group are usually identified with a common name.



methanoic acid

SAMPLE PROBLEM - Name the following:

(a) 
$$CH_3$$
 -  $C$  -  $OH$  (b)  $CH_3CH_2CH_2$  -  $C$  -  $OH$   $\parallel$   $O$ 

(c) propanoic acid (d) pentanoic acid

#### Reactions

## Condensation Reaction:

a carboxylic acid combines with another compound to produce an organic compound and a second product (such as water)

A condensation reaction between a carboxylic acid and an alcohol is called esterification.

(formation of an ester and water)

Ex.

$$CH_3 - C = OH + H = O - CH_3 --> CH_3 - C - O - CH_3 + H_2O$$

$$\parallel O$$

$$water replaces hydroxyl group$$

## **Uses of Carboxylic Acids**

Carboxylic acids are found in foods (vinegar), sting/poison treatment, and are used in the preparation of many other chemicals.

## **Esters**

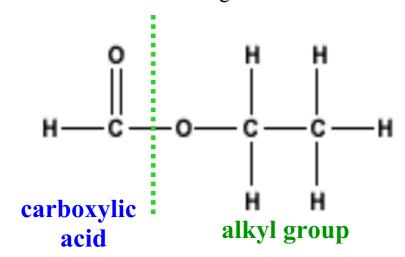
General Formula for ester:

-the functional group is similar to the carboxylic acid functional group but with the H of the carboxyl group replaced with a hydrocarbon branch (R)

### Naming esters - two parts

I. name the alkyl group in the alcohol used in the esterification.

II. name of the acid but change the "oic acid " to oate.



# ethyl methanoate

## **Uses of Esters**

Esters are often used as adhesives, perfumes, flavourings and painkillers.

# **Esters**

Name the following

(a) O (b) O 
$$\parallel$$
 CH<sub>3</sub> - C - O - CH<sub>2</sub>CH<sub>3</sub> CH<sub>3</sub> CH<sub>2</sub> - C - O - CH<sub>2</sub>CH<sub>3</sub>

Draw condensed structural diagrams for the following.

(c) pentyl methanoate

(d) methyl butanoate

# Esters Worksheet