Unit 18: Carboxylic acids and derivatives

Subunit 18.1: Carboxylic acids

Topical Question No: 1

19 One molecule of ammonia reacts with one molecule of ethyl methanoate, $HCO_2C_2H_5$, to produce one molecule of methanamide, $HCONH_2$, and only one other molecule, X.

One molecule of methanamide decomposes on heating strongly to produce one molecule of ammonia and only one other molecule, Y.

What could be the identities of X and Y?

	X	Y
A	ethanoic acid	carbon monoxide
B	ethanoic acid	hydrogen cyanide
C	ethanol	carbon monoxide
D	ethanol	hydrogen cyanide

Topical Question No: 2

29 Alcohols, aldehydes and nitriles can each be converted into carboxylic acids.

Which descriptions of their conversions into carboxylic acids are correct?

	alcohols	aldehydes	nitriles
A	hydrolysis	hydrolysis	hydrolysis
B	hydrolysis	hydrolysis	oxidation
C	oxidation	oxidation	hydrolysis
D	oxidation	oxidation	oxidation

Topical Question No: 3

21 Lactic acid (2-hydroxypropanoic acid), $CH_3CH(OH)CO_2H$, is found in sour milk.

Which reaction could occur with lactic acid?

A $CH_3CH(OH)CO_2H + CH_3OH \rightarrow CH_3CH(OCH_3)CO_2H + H_2O$

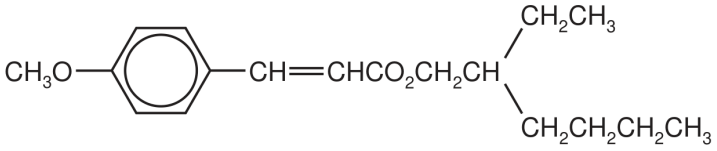
B $CH_3CH(OH)CO_2H + HCO_2H \rightarrow CH_3CH(O_2CH)CO_2H + H_2O$

C $CH_3CH(OH)CO_2H + NaHCO_3 \rightarrow CH_3CH(ONa)CO_2H + H_2O + CO_2$

D $CH_3CH(OH)CO_2H + Cl_2 \rightarrow CH_3CH(Cl)CO_2H + HOCl$

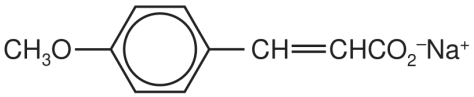
Topical Question No: 4

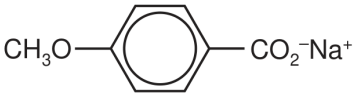
39 A sun protection cream contains the following ester as its active ingredient.



Which substances are present in the products of its hydrolysis by aqueous sodium hydroxide?

1 $CH_3CH_2CH_2CH_2CH(CH_2CH_3)CH_2OH$

2 

3 

Topical Question No: 5

40 Which reagents, when used in an excess, can be used to make sodium lactate, $CH_3CH(OH)CO_2Na$, from lactic acid, $CH_3CH(OH)CO_2H$?

1 Na

2 $NaHCO_3$

3 NaOH

Topical Question No: 6

40 *Use of the Data Booklet is relevant to this question.*

In an organic synthesis, a 62% yield of product is achieved.

Which conversions are consistent with this information?

1 74.00 g of butan-2-ol $\rightarrow$ 44.64 g of butanone

2 74.00 g of butan-1-ol $\rightarrow$ 54.56 g of butanoic acid

3 74.00 g of 2-methylpropan-1-ol $\rightarrow$ 54.56 g of 2-methylpropanoic acid

Answer Key

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