

34 Three mixtures are heated under reflux.

Which mixtures will produce sodium propanoate as one product?

- 1 $\text{CH}_3\text{CH}_2\text{CHO} + \text{NaBH}_4(\text{aq})$
- 2 $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{Na}(\text{s})$
- 3 $\text{CH}_3\text{CH}_2\text{CN} + \text{NaOH}(\text{aq})$

A 1, 2 and 3 **B** 1 and 2 only **C** 2 and 3 only **D** 3 only

35 Which compound is a product of the hydrolysis of $\text{CH}_3\text{CO}_2\text{CH}_2\text{C}_2\text{H}_5$ using aqueous sodium hydroxide?

- A** $\text{CH}_3\text{CO}_2^-\text{Na}^+$
B $\text{CH}_3\text{CO}_2\text{H}$
C $\text{C}_2\text{H}_5\text{CH}_2\text{O}^-\text{Na}^+$
D $\text{C}_2\text{H}_5\text{CH}_2\text{CO}_2^-\text{Na}^+$

37 The table shows the reagents and products of three reactions.

	reagents	products
1	ethanoic acid + Na_2CO_3	$\text{CH}_3\text{CO}_2\text{Na} + \text{H}_2\text{O} + \text{CO}_2$
2	ethanoic acid + Mg	$(\text{CH}_3\text{CO}_2)_2\text{Mg} + \text{H}_2\text{O}$
3	ethanoic acid + CH_3OH	$\text{CH}_3\text{CO}_2\text{CH}_3 + \text{H}_2\text{O}$

Which rows are correct?

A 1, 2 and 3 **B** 1 and 2 only **C** 1 and 3 only **D** 2 and 3 only

33 HOCH_2CHO is heated under reflux with an excess of acidified $\text{K}_2\text{Cr}_2\text{O}_7$ until there is no further reaction.

What is the final product of this reaction?

- A** HOOCCHO
B HOCH_2COOH
C HOCCOOH
D $\text{HOOCCH}_2\text{COOH}$

36 Which organic starting material could be used in a single reaction to produce propanoic acid?

- A** ethanenitrile
B propan-2-ol
C propanal
D propyl ethanoate

37 In four separate reactions, W, X, Y and Z, 1 mol of an organic compound reacts with an excess of a reagent.

	organic compound	reagent
W	$(\text{CH}_2\text{COOH})_2$	Na
X	$\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{COOH}$	Na_2CO_3
Y	$\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{COOH}$	NaOH
Z	$\text{CH}(\text{OH})(\text{COOH})\text{CH}_2\text{COOH}$	Na

The volume of any gas produced is collected and measured. All gas volumes are measured at the same temperature and pressure.

What is the order of the reactions from greatest total volume of gas collected to least total volume of gas collected?

	greatest volume $\longrightarrow$ least volume			
A	W	Y	Z	X
B	W	Z	Y	X
C	Z	W	X	Y
D	Z	X	W	Y

36 The structural formula of compound P is $\text{CH}_3\text{CH}_2\text{COOCH}_2\text{CH}_3$.

P can be formed by reacting together two organic compounds in the presence of a suitable catalyst.

Which pair of compounds could react together to produce P?

- A** ethanoic acid and propanoic acid
B ethanoic acid and propan-1-ol
C ethanol and propanoic acid
D ethanol and propan-1-ol