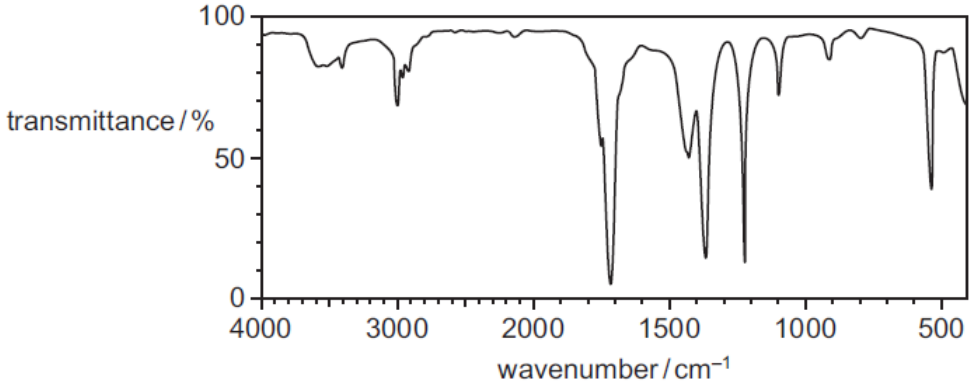
Carboxylic acids and derivatives – 2021 AS

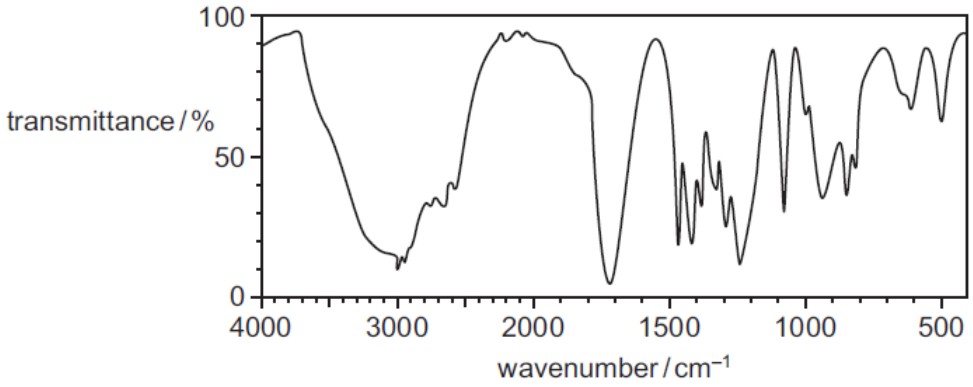
1. Nov/2021/Paper_11/No. 30

The infra-red spectra of three organic compounds are shown.

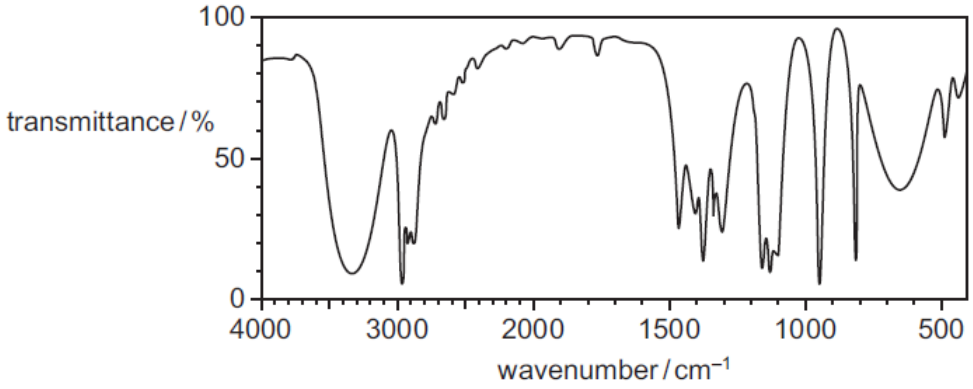
spectrum 1



spectrum 2



spectrum 3



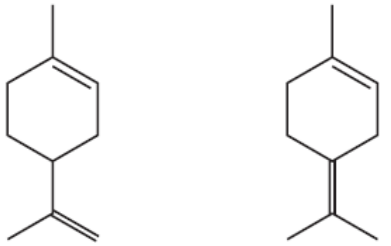
What could the three compounds be?

	spectrum 1	spectrum 2	spectrum 3
A	propanoic acid	propanone	propan-2-ol
B	propanone	propanoic acid	propan-2-ol
C	propanone	propan-2-ol	propanoic acid
D	propan-2-ol	propanoic acid	propanone

2. Nov/2021/Paper_11/No. 37

A diketo acid is a compound with two ketone groups and one carboxylic acid group.

limonene terpinolene



Which statements about the reactions of limonene and terpinolene are correct?

1 When reacted with an excess of hydrogen and a nickel catalyst, limonene and terpinolene produce the same compound.

2 An excess of hot concentrated acidified $KMnO_4$ reacts with limonene and with terpinolene to form different diketo acids.

3 The reactions of limonene and terpinolene with an excess of Br_2 produce positional isomers with the same number of chiral carbon atoms.

The responses **A** to **D** should be selected on the basis of

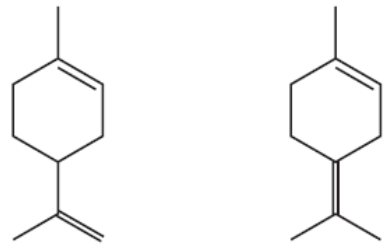
A	B	C	D
1, **2** and **3** are correct	**1** and **2** only are correct	**2** and **3** only are correct	**1** only is correct

No other combination of statements is used as a correct response.

3. Nov/2021/Paper_13/No. 37

A diketo acid is a compound with two ketone groups and one carboxylic acid group.

limonene terpinolene



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No other combination of statements is used as a correct response.

4. March/2021/Paper_12/No. 29

Which reaction gives butanoic acid as one of its products?

A acid hydrolysis of butyl ethanoate

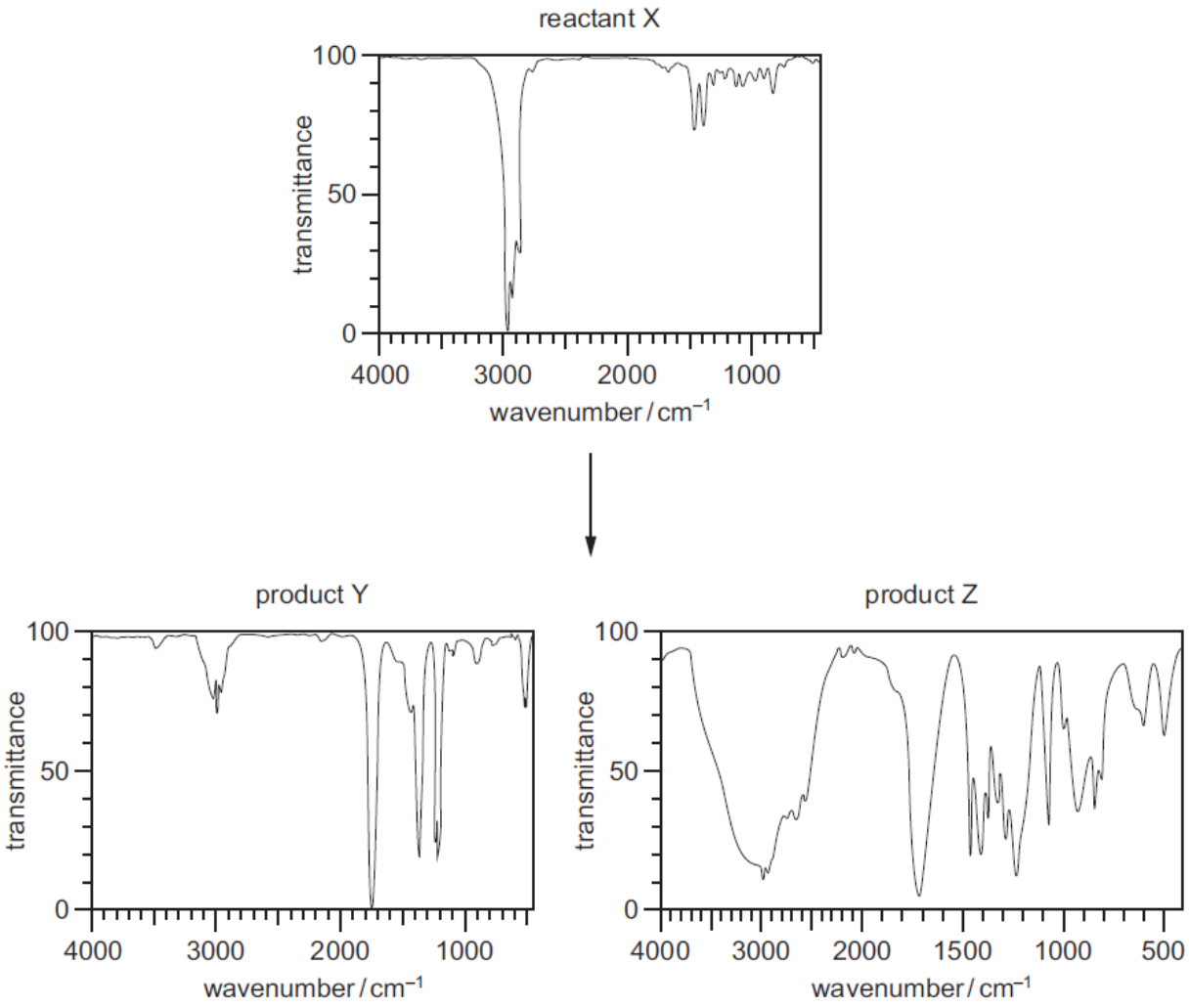
B alkaline hydrolysis of butyl ethanoate

C acid hydrolysis of ethyl butanoate

D alkaline hydrolysis of ethyl butanoate

5. March/2021/Paper_12/No. 30

When reactant X is treated with a suitable reagent, products Y and Z are formed. Infrared spectra of X, Y and Z are shown.



Which row could be correct?

	X	Y	Z
A	2,3-dimethylpent-2-ene	propanone	butanone
B	2-methylpent-2-ene	propanone	propanoic acid
C	pent-2-ene	ethanoic acid	propanoic acid
D	propyl propanoate	propan-1-ol	propanoic acid

6. March/2021/Paper_12/No. 40

An organic compound, T, does **not** fizz when aqueous sodium carbonate is added to it.

Compound T contains 27.6% by mass of oxygen.

What could be the identity of T?

1 propanal

2 ethyl butanoate

3 3-methylpentanoic acid

7. June/2021/Paper_11/No.24

The compound cetyl palmitate, $C_{15}H_{31}CO_2C_{16}H_{33}$, is a waxy solid.

Cetyl palmitate is heated under reflux with an excess of aqueous sodium hydroxide.

Which products will be formed?

A $C_{15}H_{31}ONa$ and $C_{16}H_{33}CO_2Na$

B $C_{15}H_{31}CO_2Na$ and $C_{16}H_{33}ONa$

C $C_{15}H_{31}OH$ and $C_{16}H_{33}CO_2Na$

D $C_{15}H_{31}CO_2Na$ and $C_{16}H_{33}OH$

8. June/2021/Paper_11/No.30

Butanoic acid is prepared from 1-bromopropane.

This synthesis requires a sequence of two reactions.

Which compound is prepared in the first stage of the synthesis?

A 1-aminopropane

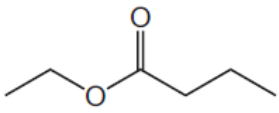
B propan-1-ol

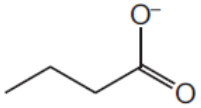
C butanal

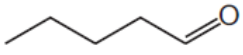
D butanenitrile

9. June/2021/Paper_12/No.40

Which mixtures form a carboxylic acid as one of the products?

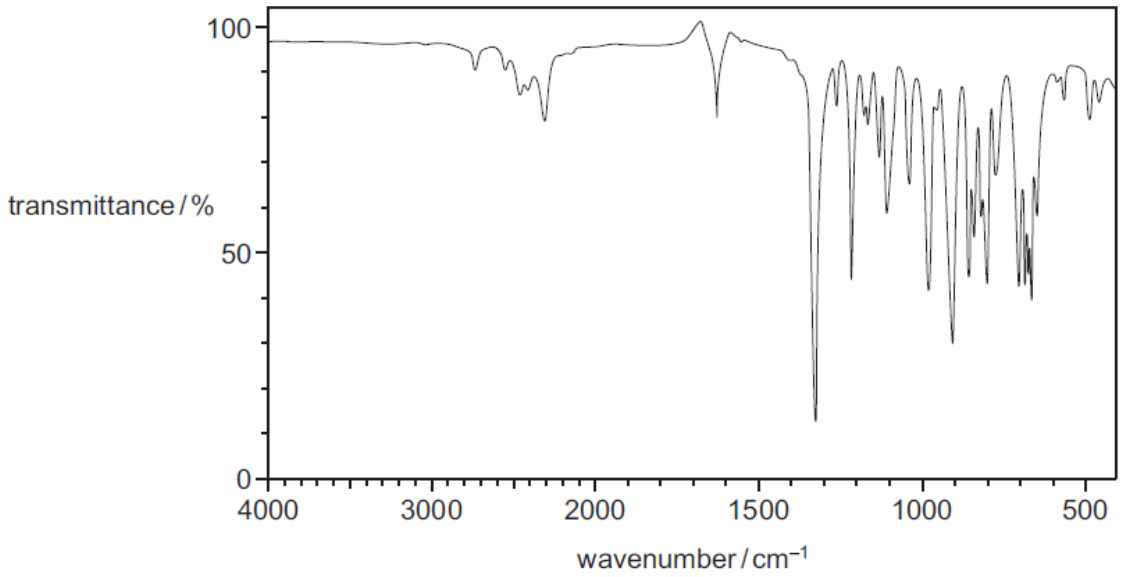
1  + $H_2SO_4(aq)$ →

2  + $H_2SO_4(aq)$ →

3  + $H_2SO_4(aq)$ →

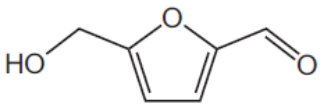
10. June/2021/Paper_13/No.30

The infra-red spectrum of molecule Z is shown.

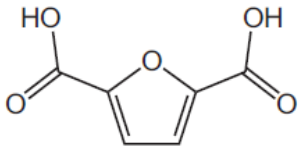


What could be the identity of Z?

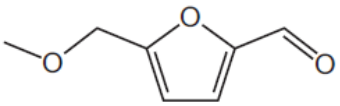
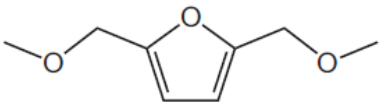
A



B



C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