#### AQA – Organic analysis – AS Chemistry P2

### 1. June/ 2020/Paper 2/No.3

A student investigates two experimental methods of making methylpropanal. The equations for these two methods are shown.

# 

Method 2

OH + 
$$H_2O_2$$
 $M_r = 74.0$ 

H +  $2H_2O_2$ 
 $M_r = 72.0$ 

In each method, the student uses 1.00 g of organic starting material.

The yield of methylpropanal obtained using each method and other data are included in **Table 3**.

Table 3

	Method 1	Method 2
Yield of methylpropanal / mg	552	778
Percentage yield		80.0%
Percentage atom economy	62.1%	

Calculate the percentage yield for Method 1.

Calculate the percentage atom economy for Method 2.

State the importance of percentage yield and percentage atom economy when choosing the method used to make a compound.

[6 marks]

	% yield
Importance of percentage yield	
Importance of percentage yield	
	% atom economy
Importance of percentage atom economy	·

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Which can be used to distinguish between these two compounds?

(CH<sub>3</sub>)<sub>2</sub>CHCH<sub>2</sub>CHO and (CH<sub>3</sub>)<sub>3</sub>CCHO

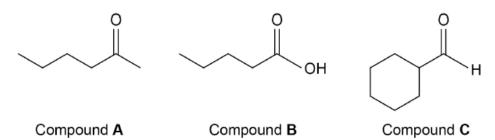
[1 mark]

- A Acidified potassium dichromate(VI)
- B Fingerprint region of infrared spectrum
- **C** M<sub>r</sub> value in high resolution mass spectrometry □
- D Tollens' reagent

## 3. June/ 2019/Paper 2/No.1

0 1

The structures of three organic compounds A, B and C are shown.



These compounds can be distinguished by simple test-tube reactions.

For each pair of compounds in questions **01.1** and **01.2**, give a reagent (or combination of reagents) that could be added separately to each compound to distinguish between them.

State what is observed in each case.

0	1	1	Compounds <b>A</b> and	В

Reagent \_\_\_\_\_\_Observation with A \_\_\_\_\_\_

Observation with B

0 1 . 2 Compounds A and C

[3 marks]

Characteristics 
Observation with A

Observation with C

4.

,, _0_0, up	per_2/No.7
0 7	Propanedioic acid contains two carboxylic acid groups. It is a solid organic acid that is soluble in water.
0 7.1	Draw the skeletal formula of propanedioic acid.  [1 mark]
0   7  . 2	Describe how to prepare 250 cm <sup>3</sup> of an aqueous standard solution of propanedioic acid containing an accurately measured mass of the acid. Include essential practical details in your answer.  [6 marks]
	[cilialization

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0 7 . 3	Calculate the mass, in mg, of propanedioic acid ( $M_r$ = 104.0) needed to prepare 250 cm <sup>3</sup> of a 0.00500 mol dm <sup>-3</sup> solution.	)
	250 cm <sup>3</sup> of a 0.00500 mol dm <sup>-3</sup> solution.	marks]
	•	•
	Mass of propanedioic acid	ma

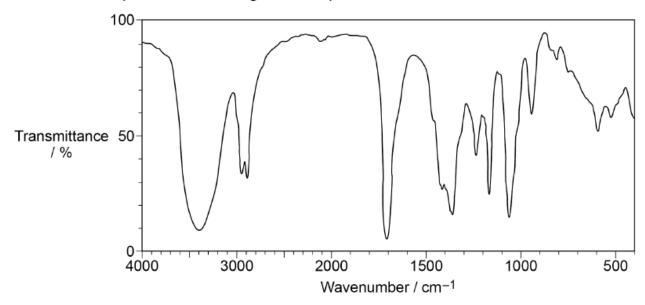
5.	June/ 2019/Paper_2/No.14  How many isomers are there of C <sub>3</sub> H <sub>9</sub> N?	
		[1 mark]
	<b>A</b> 2	0
	<b>B</b> 3	0
	C 4	0
	<b>D</b> 5	0
6.	June/ 2019/Paper_2/No.16  Which compound can react with ammonia to produce propylamine?	
		[1 mark
	A CH <sub>3</sub> CH=CH <sub>2</sub>	0
	B CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> OH	0

 $\textbf{C} \ \text{CH}_3\text{CH}_2\text{CH}_2\text{Br}$ 

D CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>

## **7.** June/ 2019/Paper\_2/No.23

The infrared spectrum of an organic compound is shown.



Which compound produces this spectrum?

[1 mark]

A ethanoic acid

0

B 4-hydroxybutanone

0

C propan-1-ol

0

**D** prop-2-en-1-ol

0

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A student has samples of these four compounds but does not know which is which:

- butanoic acid
- 2-methylpropanal
- 2-methylpropanoic acid
- 2-methylpropan-1-ol
- Step 1: Two of these compounds can be identified by simple chemical tests.
- Step 2: The other two compounds, that contain the same functional group as each other, can then be distinguished using a spectroscopic technique.

Describe how these two steps could be used to identify which compound is	which. [6 marks]

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9. June/ 2022/Paper\_2/No.16

	Which reaction does <b>not</b> result in a change in the shape around a carbon atom?  [1 ma			
	A chloromethane with ac	ueous sodium hydroxide	0	
	<b>B</b> ethene with bromine		0	
	C propane with excess o	0		
	D propan-1-ol with acidif	0		
10.	June/ 2021/Paper_2/No.21  When 2-bromobutane is elimination reactions both  Which of these compoun	solution, substitution and [1 mark]		
	A butan-1-ol	0		
	B butan-2-ol	0		
	C but-1-ene	0		
	<b>D</b> E-but-2-ene	0		