

Chemistry  
Paper 2  
Higher Tier

Wednesday 10 June 2020 – Morning

Diagram Booklet

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

**INSTRUCTIONS**

There may be spare copies of some diagrams in case you need them.

**THIS DIAGRAM BOOKLET *MUST* BE RETURNED WITH THE  
QUESTION PAPER AT THE END OF THE EXAMINATION.**

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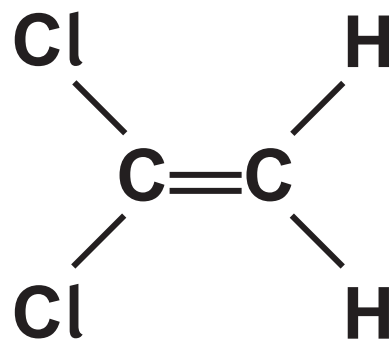
Question 3(a)

Figure 1

size of calcium carbonate pieces used	volume of carbon dioxide gas produced in five minutes in cm <sup>3</sup>
large	16
small	48
powder	90

## Question 4

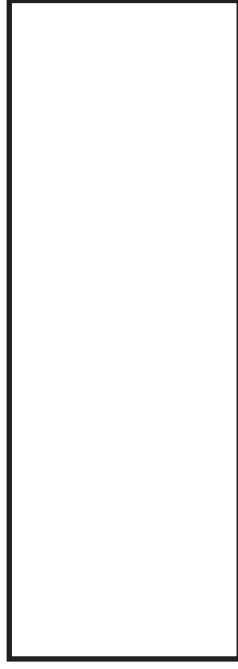
Figure 2



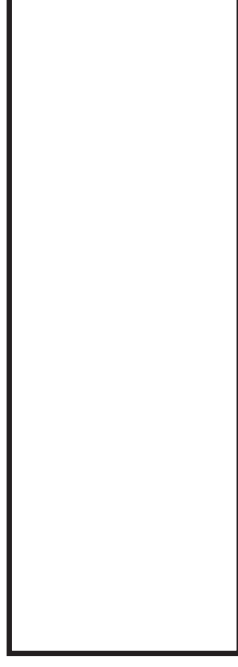
Question 5(a)

Figure 3

monomer A	monomer B
$\text{HO}-\text{CH}_2-\text{CH}_2-\text{OH}$	$\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{COOH}$

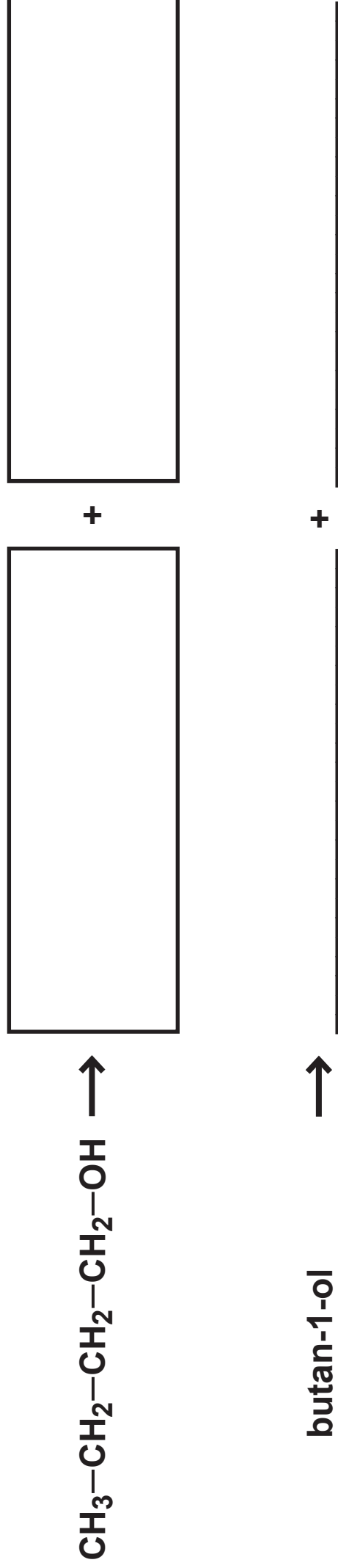


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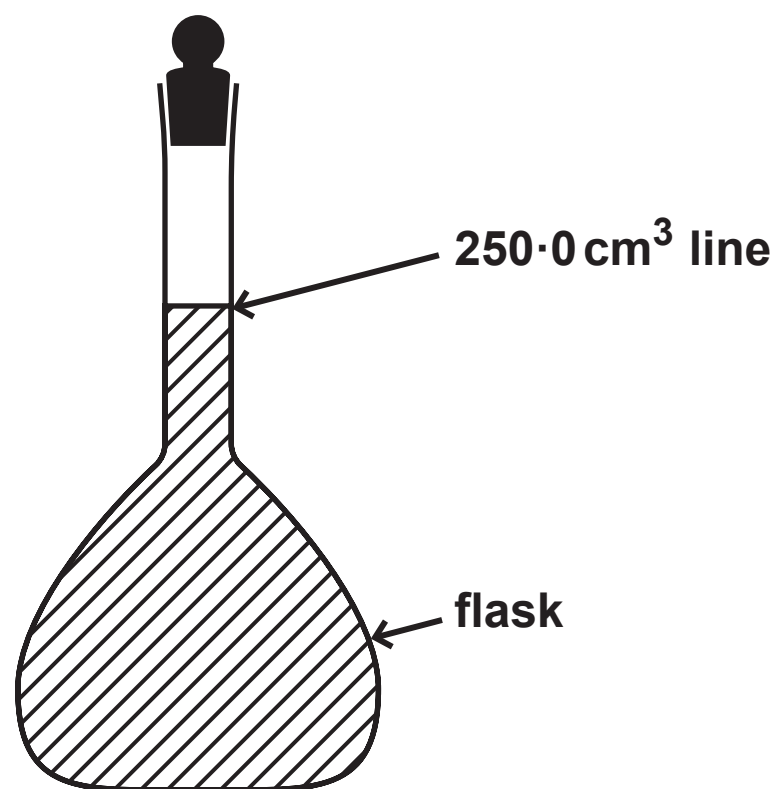
## Question 7(b)

Figure 4

mass of stopper and flask in g	78.639
mass of stopper and flask full of argon in g	79.120
volume of flask in cm <sup>3</sup>	250.0

## Question 7(b)(ii)

Figure 5

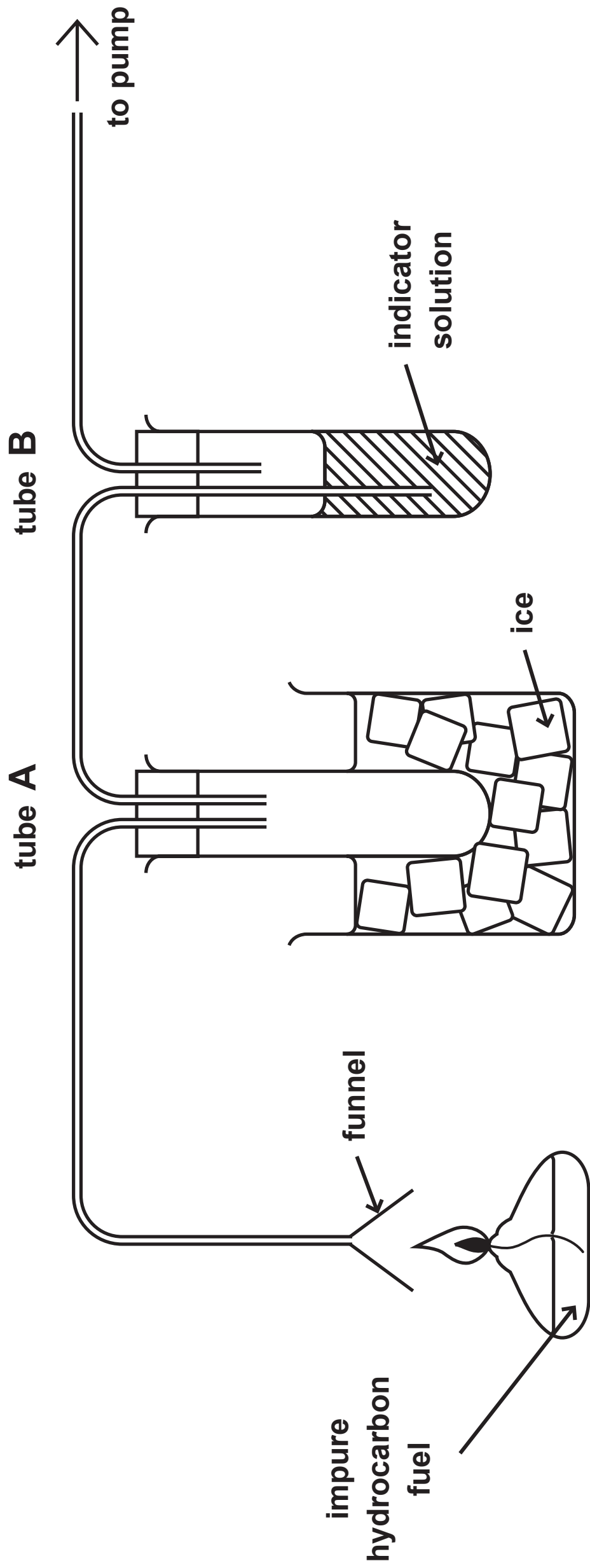


## Question 7(e)

Figure 6

<b>test</b>	<b>result with gas mixture P</b>	<b>result with gas mixture Q</b>
<b>bubble gas into limewater</b>	<b>white precipitate forms after 4 minutes</b>	<b>white precipitate forms after 10 seconds</b>
<b>place burning splint into gas mixture</b>	<b>splint continues to burn</b>	<b>splint immediately goes out</b>

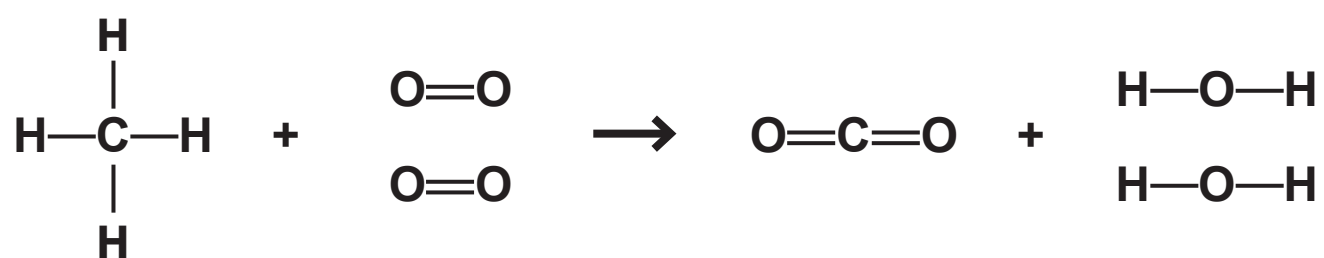
Figure 7



## Question 9(b)

Figure 8

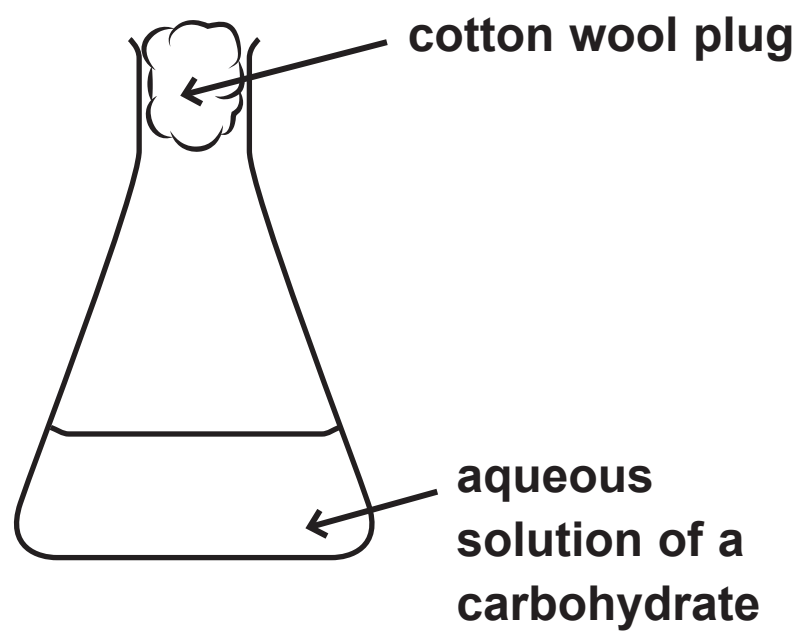
bond	bond energy in $\text{kJ mol}^{-1}$
<b>C—H</b>	<b>435</b>
<b>O=O</b>	<b>496</b>
<b>C=O</b>	<b>805</b>
<b>H—O</b>	<b>463</b>



Question 9(c)

Figure 9

	emissions in gkm <sup>-1</sup>			
	carbon monoxide	nitrogen oxides	carbon dioxide	carbon particulates
car with no catalytic converter using petrol	1·60	0·09	180	0·00
car with catalytic converter using petrol	0·67	0·02	180	0·00
car using diesel	0·05	0·19	130	0·02

**Question 10(a)****Figure 10**

## Question 10(a)(ii)

Figure 11

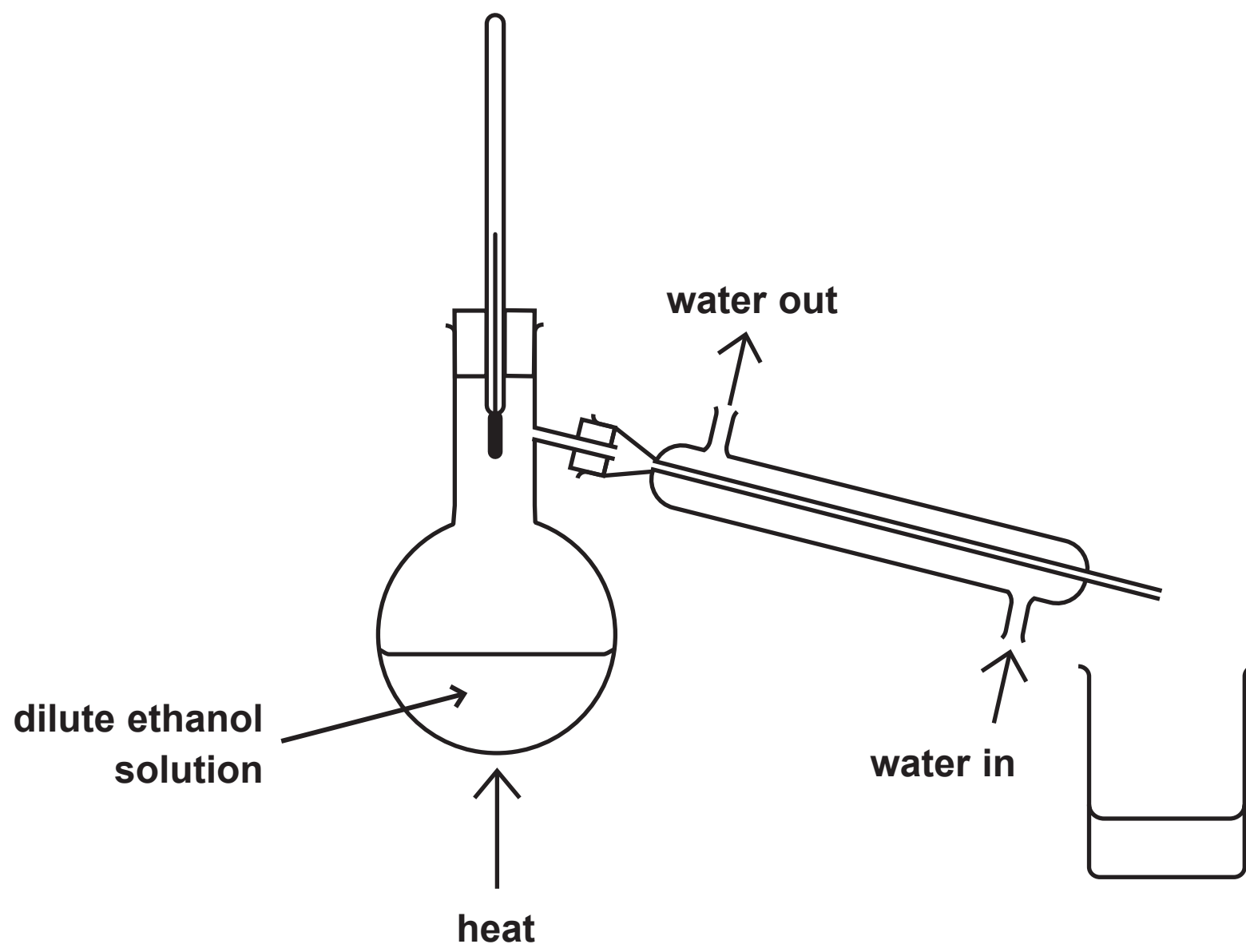




Figure 12

name	structural formula	formula mass	density in gcm <sup>-3</sup>	boiling point in °C	does it react with an alcohol?	does it react with sodium hydroxide solution?
butanoic acid	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> COOH	88	0.96	164	yes	yes
ethanoic acid	CH <sub>3</sub> COOH	60	1.05	118	yes	yes
hexanoic acid	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> COOH	116	0.93	205	yes	yes
pentanoic acid	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> COOH	102	0.94	186	yes	yes
propanoic acid	CH <sub>3</sub> CH <sub>2</sub> COOH	74	0.99	141	yes	yes