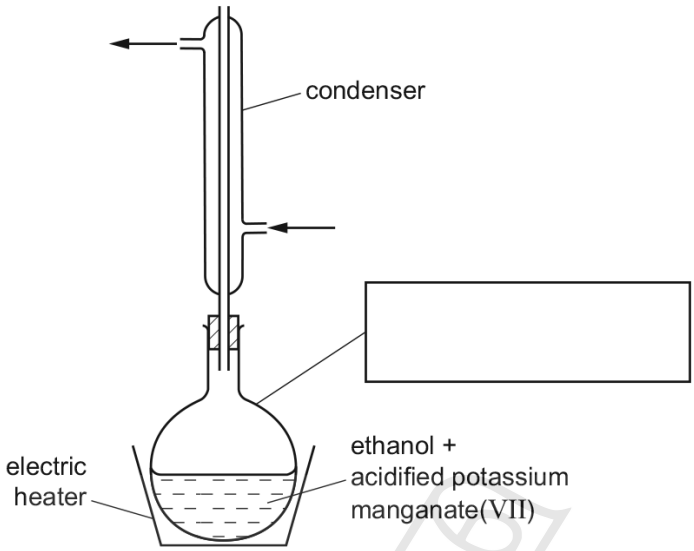
## 13.4 Carboxylic acids

01. 0620_s15_qp_61 Q: 1

Ethanol was reacted with hot acidified potassium manganate(VII) solution using the apparatus below. Ethanoic acid was formed.




**(a) (i)** Complete the box to identify the piece of apparatus labelled. [1]

**(ii)** Label the arrows. [1]

**(b) (i)** Suggest and explain why an electric heater is used to heat this reaction and not a Bunsen burner.

.....

..... [2]

**(ii)** Suggest why a condenser is necessary.

..... [1]

**(c)** Complete the table to show the difference in smell between ethanol and ethanoic acid.

| | smell |
|---|---|
| ethanol | |
| ethanoic acid | |

[2]

[Total: 7]

02. 0620_w12_qp_62 Q: 6

**(a)** Ethanoic acid can be prepared by heating ethanol with acidified potassium manganate(VII).
Give a test to distinguish between ethanoic acid and ethanol.

test .....

result ..... [2]

**(b)** Coal is a fossil fuel. When heated strongly, sulfur dioxide gas is one of the products formed.
Sulfur dioxide changes the colour of acidified potassium manganate(VII) from purple to colourless.
Plan an investigation to show which of the **two** different types of coal produces the most sulfur dioxide when heated. You are provided with one lump of each type of coal.

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..... [6]

[Total: 8]

01. 0620_s15_ms_61 Q: 1

| | | | |
|---|---|---|---|
| (a)(i) | flask; | 1 | |
| (a)(ii) | top arrow water **and** bottom arrow water; | 1 | |
| (b)(i) | to prevent fire / ref. to safety / controlled heating;<br>ethanol is flammable; | 2 | **I** dangerous |
| (b)(ii) | to prevent evaporation / loss of reactants or ethanol; | 1 | |
| (c) | *ethanol:* sweet / nail varnish remover / alcohol / spirit;<br>*ethanoic acid:* vinegar / sour / acid / sharp / pungent; | 2 | **I** strong / pleasant |

02. 0620_w12_ms_62 Q: 6

**(a)** test (1) e.g. add named indicator/marble chip/magnesium
result (1) e.g. ethanoic acid changes colour of indicator/ethanoic acid effervesces [2]
**allow:** lighted splint (1) ethanol burns (1)

**(b)** any 6 from:
weigh coal/equal masses/equal amounts (1)
crush (1)
heat (1)
in a fume cupboard (1)
pass through potassium manganate (1)
time to colourless (1)
repeat with other coal (1)
compare/conclusion (1) [6]

**[Total: 60]**