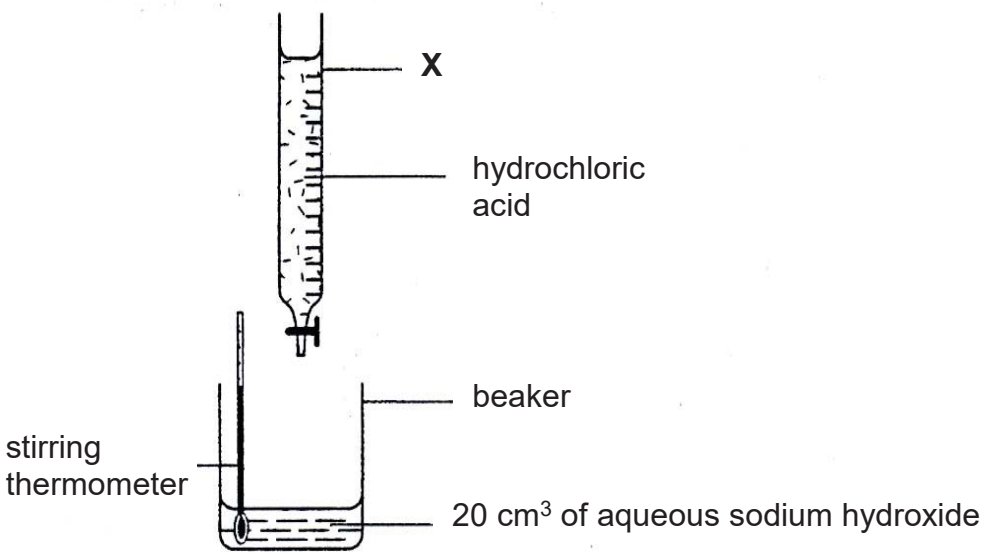
Section B [16 marks]

Answer any **two** questions from this section in the spaces provided.

4 A student set up the following apparatus.



Dilute hydrochloric acid was added 5 cm^3 at a time to the beaker of aqueous sodium hydroxide. This was continued until 30 cm^3 of acid had been added. The mixture was stirred and the highest temperature taken after the addition of each 5 cm^3 of acid. The results obtained are shown below. The initial temperature of both solutions was 21 °C.

The results are shown in the table.

total volume of acid added / cm^3	0	5	10	15	20	25	30
temperature of mixture/ cm^3	21.0	24.2	27.4	30.6	33.0	31.0	29.2

(a) Name the apparatus labelled **X**.

……[1]

(b) Name the type of reaction that is taking place during the experiment.

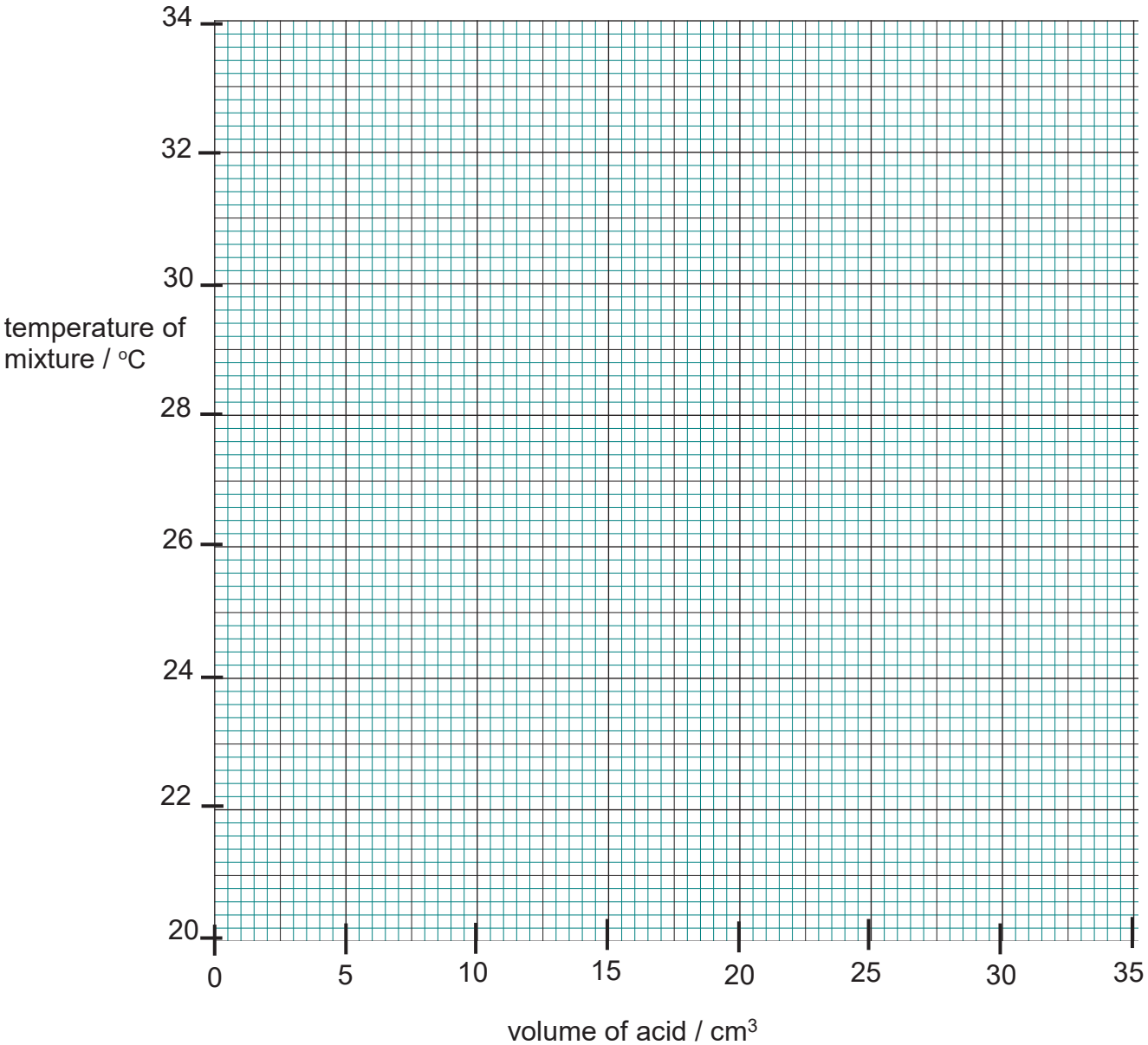
……[1]

(c) Write a balanced chemical equation for the reaction. State symbols are **not** required.

……[1]

(d) Plot a graph of these result, marking each point with a cross (x).

Draw **two** intersecting lines, taking into account all the relevant points, to show the rise in temperature and the fall in temperature. [2]



(e) State the volume of acid required to completely react with sodium hydroxide.

……

……[1]

(f) Universal indicator is added to the final mixture at the end of the experiment.
What colour will be observed? Give a reason.

……

……

……

……[2]

5 **(a)** The table shows the composition of air in two towns **A** and **B**.

town	oxygen %	nitrogen %	carbon dioxide %	sulfur dioxide %
A	20.0	79.7	0.2	0.0
B	18.8	79.7	0.9	0.5

(i) Name **one** component of air **not** listed in the table.

…… [1]

(ii) State which town can industrial factories be found? Explain your answer with reference to the table above.

……

…… [2]

(iii) Describe the test for oxygen gas.

test: ……

observation: …… [2]

(b) Rose gold is a mixture of copper and gold. It is commonly used in making jewellery such as necklaces.

(i) What is the name given to a mixture of metals?

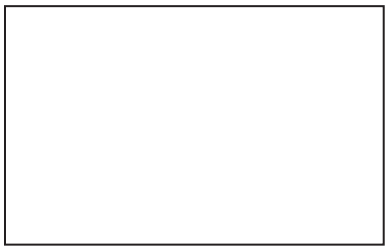
…… [1]

(ii) Why is pure gold **not** used in making jewellery such as necklaces?

……

…… [1]

(iii) In the box below, draw a diagram to show how the atoms of gold and copper are arranged in rose gold.



[1]

6 (a) Complete the table below

alkene	molecular formula	structural formula
ethene		
propene		

[2]

(b) Describe **one** change in the physical properties of alkenes down the homologous series.

……

……[1]

(c) Name a chemical reagent that can be used to show the difference between a saturated and an unsaturated hydrocarbon.
Describe what you would observe when this reagent is added to separate samples of ethane and ethene.

reagent ……

observation with ethane ……

……

observation with ethene ……

…… [3]

(d) Propene can be produced together with **one** other product from the cracking of tetradecane, $C_{14}H_{30}$. Complete the equation below.

$C_{14}H_{30} \rightarrow$ ..... + ... [1]

(e) State the conditions for cracking.

.....

..... [1]

END OF PAPER 4