Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

CHEMISTRY 0620/6

PAPER 6 Alternative to Practical

OCTOBER/NOVEMBER SESSION 2001 1 hour

Candidates answer on the question paper.
Additional materials:
None

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE

This question paper consists of 11 printed pages and 1 blank page.

[Turn over

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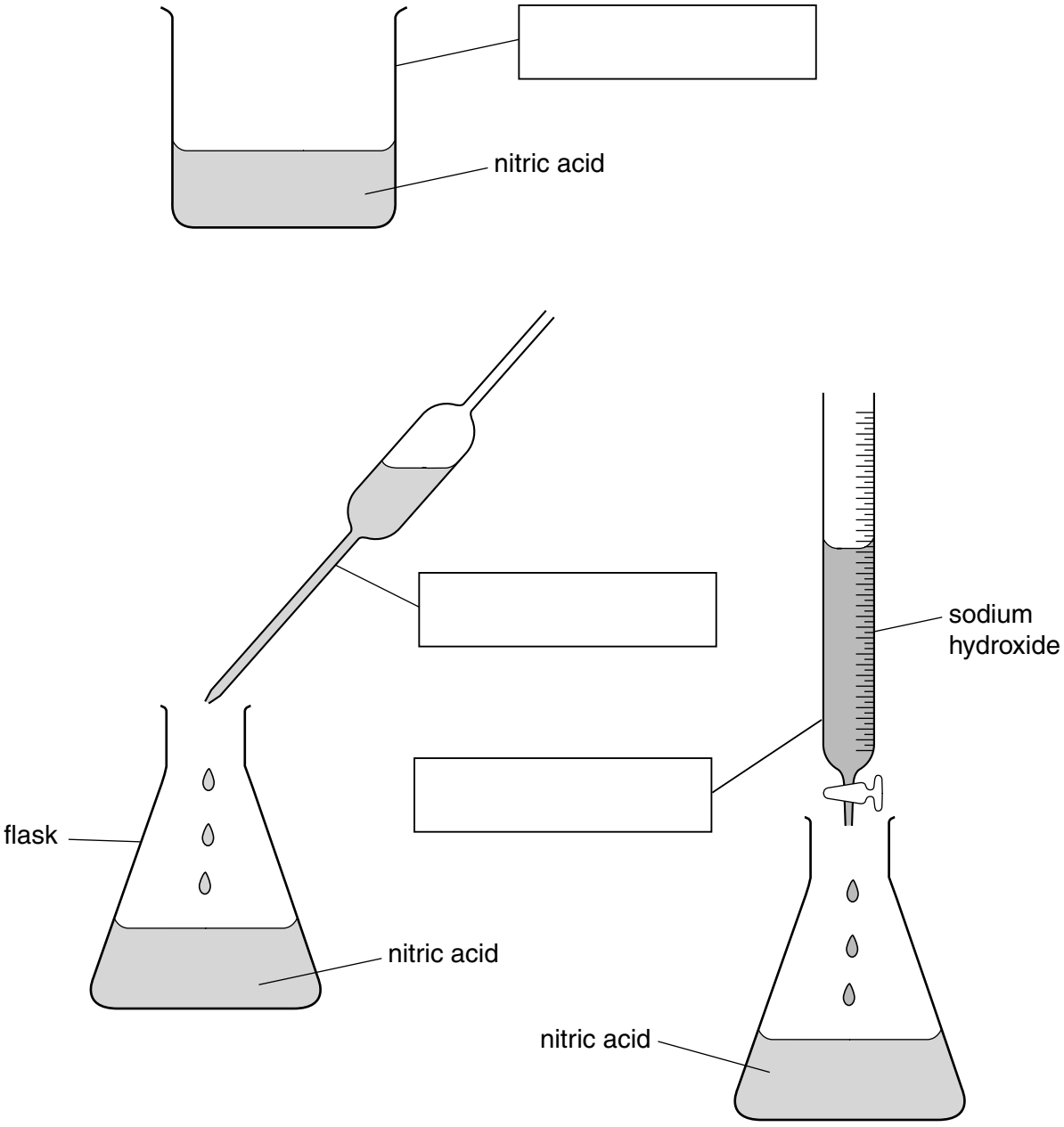
1 The diagrams show the apparatus used to find the concentration of a nitric acid solution.

25.0 cm^3 of nitric acid was added to a flask.

Sodium hydroxide was added to the acid until the solution was neutral. The volume of the sodium hydroxide was noted.



(a) Complete the boxes to name the apparatus used. [3]

(b) How could you tell when the solution was neutral?

.....

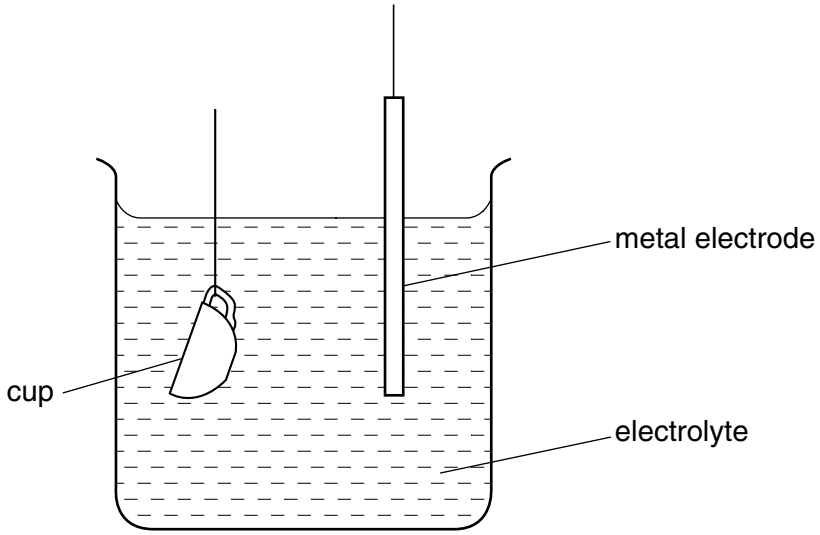
.....[2]

(c) How could the accuracy of the results be checked?

.....[1]

[Turn over

2 A metal cup can be coated in silver by electrolysis. The cup must be very clean and also rotated during the process, which is known as electroplating.



(a) Should the metal cup be the anode or the cathode?

.....[1]

(b) Identify the metal from which the electrode is made.

.....[1]

(c) Suggest a suitable electrolyte that could be used to electroplate this cup.

.....[2]

(d) Suggest why the cup must be

(i) very clean, ...

.....[1]

(ii) rotated during the electrolysis. .....

.....[1]

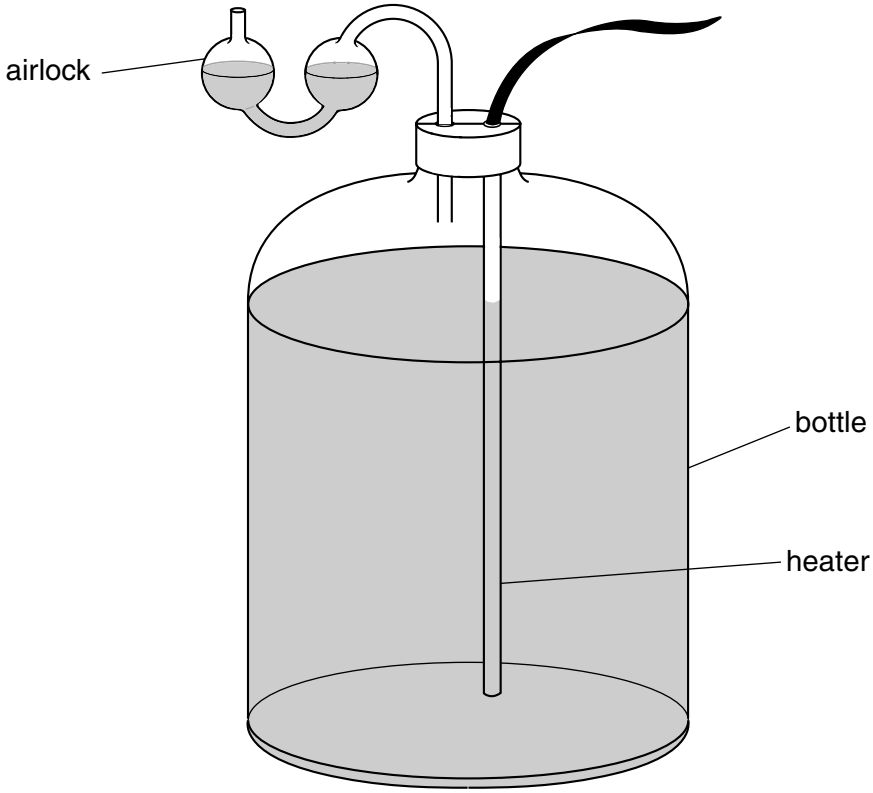
3 A student fermented some orange juice using the following instructions.

Step 1 Slice an orange and put the slices into a beaker and cover them with water. Boil the water for 10 minutes.

Step 2 Filter the mixture into a clean bottle.

Step 3 Add one measure of yeast to the juice when it has cooled.

Step 4 Set up the apparatus shown below and leave to ferment.



(a) Why was the orange sliced in Step 1?

.....[1]

(b) Why was the juice cooled before adding the yeast?

.....[1]

(c) What could be used to add the yeast in Step 3?

.....[1]

(d) Explain why it was important to keep the temperature of the mixture in the bottle at 30°C–40°C.

.....

.....[2]

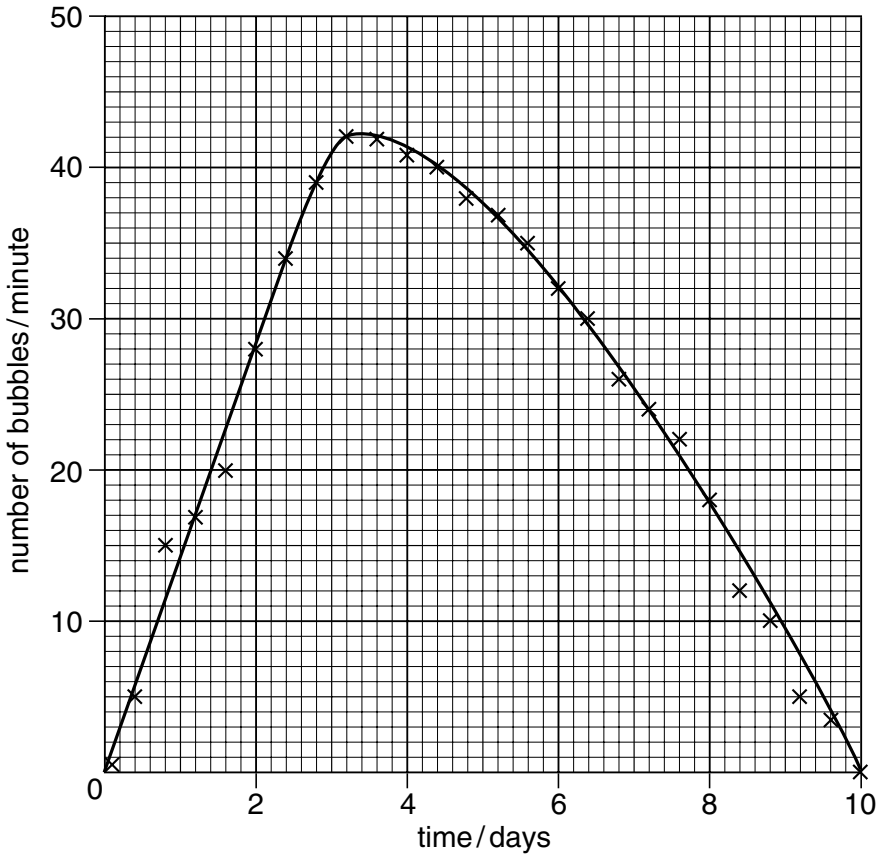
[Turn over

(e) Explain why an airlock was used.

.....

.....[2]

(f) The bubbles of gas coming through the airlock in one minute were counted over several days. The results are shown on the graph.



(i) When was the rate of formation of alcohol quickest?

.....[2]

(ii) When did the fermentation stop?

.....[1]

(iii) Give two reasons why the fermentation may have stopped.

1. .....

2. .....[2]

4 A student investigated the reaction between magnesium and sulphuric acid.

Experiment 1

Using a measuring cylinder, a 10 cm^3 sample of dilute sulphuric acid was added into a boiling tube. The initial temperature of the acid was measured and recorded. A 1 cm length of magnesium ribbon was added to the acid in the boiling tube. The mixture was stirred with a thermometer and the maximum temperature reached was measured and recorded.

(a) The gas given off was tested with a lighted splint.

result of test

.....

name of gas given off

.....
[2]

Experiment 2

Experiment 1 was repeated using a 2.5 cm length of magnesium.

Experiment 3

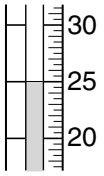
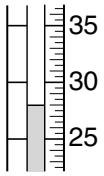
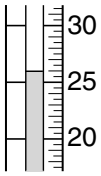
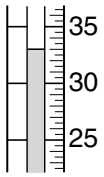
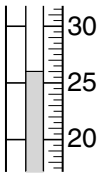
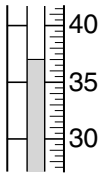
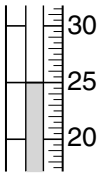
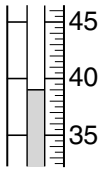
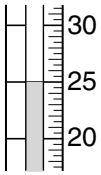
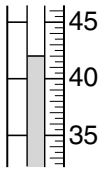
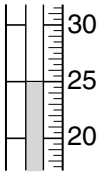
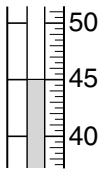
Experiment 1 was repeated using a 3 cm length of magnesium.

This procedure was followed for *Experiments 4, 5 and 6* using 4 cm, 5 cm and 6 cm lengths of magnesium.

The results are shown on the next page.

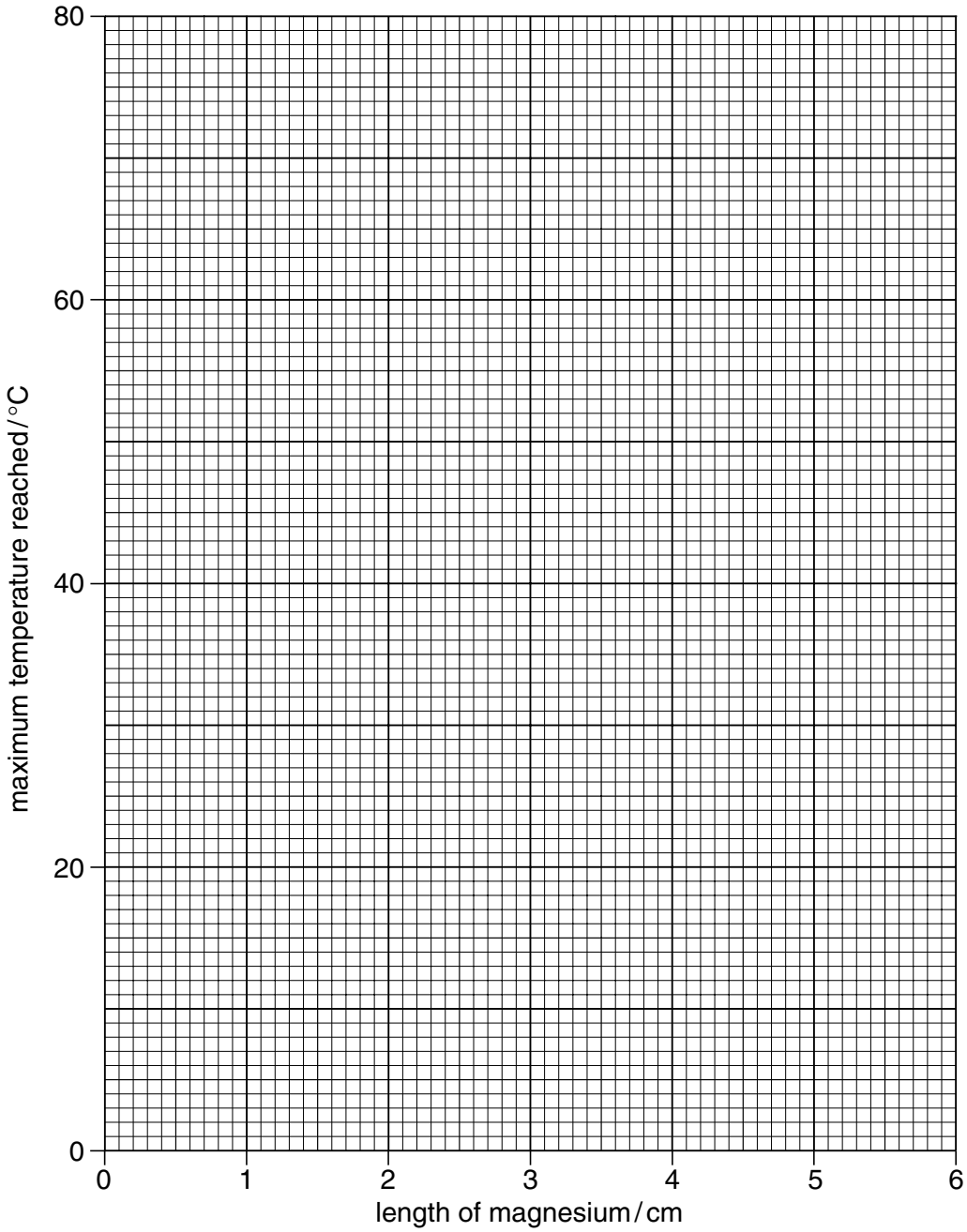
[Turn over

Use the thermometer diagrams to read the temperatures and record the values in the table.

experiment	length of magnesium /cm	initial temperature of acid/°C		maximum temperature of acid/°C	
1	1				
2	2.5				
3	3				
4	4				
5	5				
6	6				

[3]

(b) Plot the maximum temperature reached for Experiments 1 to 6 on the grid and draw a straight line graph.



[4]

(c) **From your graph**, find the maximum temperature of the mixture when a 2 cm length of magnesium reacted with 10 cm^3 of sulphuric acid of the same concentration.

Show **clearly** on the grid how you obtained your answer.

.....[2]

(d) What word is used to describe a reaction where the temperature increases?

.....[1]

[Turn over

(e) **(i)** In which experiment was the largest temperature change noted?

.....[1]

(ii) Explain why this experiment gave the largest temperature change.

.....

.....[2]

(f) Explain **one** improvement that could be made to **the experimental procedure** to obtain more accurate results.

improvement .....

explanation .....

.....[2]

5 The solid **P** contained the iron(II) cation, another cation and one anion.
The tests on an aqueous solution of **P** and some of the observations are in the following table.
Complete the observations in the table.

tests	observations
(a) (i) To about 1cm^3 of solution **P** was added excess aqueous sodium hydroxide and shaken	....[2]
(ii) The mixture was heated gently until boiling. The gas given off was tested with pH indicator paper.	Indicator paper turned blue pH 11
(b) To about 1 cm^3 of solution **P**, was added a few drops of dilute sulphuric acid and potassium manganate(VII) solution. The colour change was noted. The iron(II) ions were oxidised to iron(III) ions. Aqueous sodium hydroxide was added with shaking until no further change.	.....[2]
(c) To 1 cm^3 of solution **P**, was added aqueous ammonia with shaking until excess ammonia was present.	....[2]
After 5 minutes, describe the surface of the mixture.	....[1]
(d) To 1 cm^3 of solution **P** was added drops of dilute hydrochloric acid and then aqueous barium chloride.	white precipitate

(e) What gas is given off in test **(a)**?

.....[1]

(f) Identify the other cation present in solid **P**.

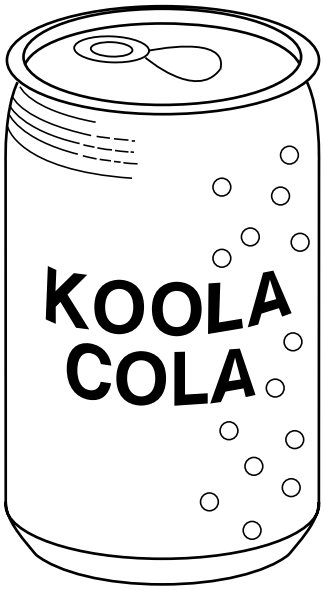
.....[1]

(g) Identify the anion present in solid **P**.

.....[1]

[Turn over

6 You are provided with cans of a fizzy drink – Koola cola.



Plan tests to investigate the cola so that you can answer the following four questions.

(a) What is the pH of the cola?

.....

.....[2]

(b) How many coloured pigments does the cola contain?

.....

.....

.....

.....

.....[3]

(c) What volume of gas is released when a can of cola is opened? [Note: The can will have to be opened under water.]

.....

.....

.....[2]

(d) Is the gas released carbon dioxide?

.....

.....[2]