KING'S COLLEGE JUNIOR SCHOOL

WIMBLEDON

King's College School

Transfer Paper

Specimen

CHEMISTRY

This exam is 40 minutes long.

Answers should be written on the question paper.

Answer **all** questions.

Please fill in the following details

Name:……..

Form:……

Please answer all questions.

1. Underline the word, phrase or number which best completes each of the following sentences.

(a) A black solid element reacts with oxygen to form an oxide which is a gas. The element could be

carbon **copper** **iron** **sulphur**

(b) Both the solute and the solvent can be obtained from a solution by

chromatography **distillation** **evaporation** **filtration**

(c) Electrical wires are usually made of

copper **lead** **silver** **tin**

(d) When heated, potassium manganate (vii) gives off

hydrogen **oxygen** **carbon dioxide** **nitrogen**

(e) Something which will not dissolve in water is

insoluble **insolvent** **salt** **soluble**

(f) The substance with the highest pH in this list is

limewater **vinegar** **dilute hydrochloric acid** **water**

(g) A substance having a fixed volume and shape would be a

gas **liquid** **solid** **vapour**

(h) The gas which makes up about 20% by volume of the atmosphere is

hydrogen **oxygen** **carbon dioxide** **nitrogen**

(i) The ph value of a strong alkali could be

1 **4** **7** **13**

(j) When sulphur reacts with air to give sulphur dioxide, the reaction can be described as

combustion **condensation** **decomposition** **neutralisation**

maximum 10 marks

2. Paul had four substances:

citric acid	**copper sulphate**	**indigestion tablet**	**sugar**

He dissolved 1 g of each substance in 20 cm^3 of distilled water.
He used universal indicator to find the pH of each solution.

(a) (i) Sugar solution does **not** change the colour of green universal indicator.

What does this tell you about sugar solution?
Tick the correct box.

It is an acid.	☐	It is an alkali.	☐
It is neutral.	☐	It is sweet.	☐

1 mark

(ii) Suggest the pH of citric acid.

.....

1 mark

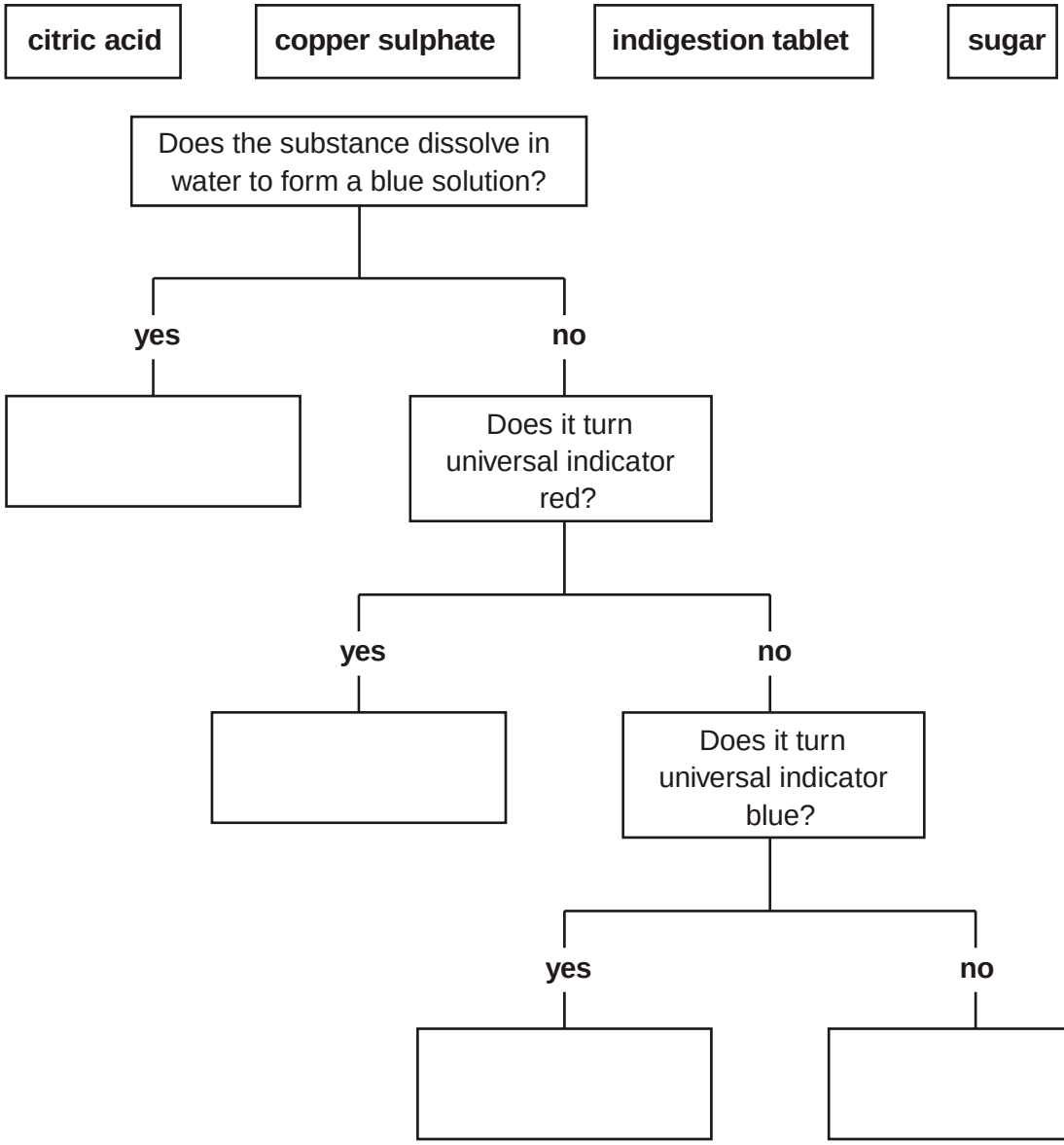
(iii) Indigestion tablets neutralise acid in the stomach.

What does this tell you about indigestion tablets?

.....

1 mark

(b) Complete the flow chart below with the names of the substances in the boxes.



3 marks

maximum 6 marks

3. Different metals are used to make different things.

(a) Draw lines to match each metal to **one** use and to **one** property which makes the metal good for that use.

3 marks

metal	use	property
aluminium	racing bicycle frames	does not react easily
gold	compass needle	lightweight
steel	jewellery	magnetic

(b) A pipe for hot water is made from copper wrapped in plastic foam.

(i) Which property makes copper suitable for making pipes for hot water? Tick the correct box.

Copper is a shiny metal.	☐
Copper is a good conductor of heat.	☐
Copper does **not** react with water.	☐
Copper is a good conductor of electricity.	☐

1 mark

(ii) Why is plastic foam used to wrap hot water pipes?

.....

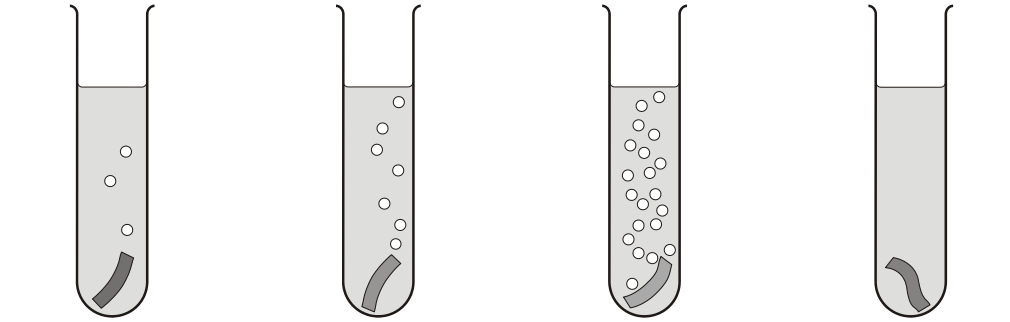
.....

1 mark

Maximum 5 marks

4. (a) Ruth put a piece of a different metal in each of four test tubes.

She poured 10 cm^3 of hydrochloric acid onto each metal.



iron + hydrochloric acid

zinc + hydrochloric acid

magnesium + hydrochloric acid

copper + hydrochloric acid

Look at the diagrams above.

(i) How do these show if a metal reacts with the acid?

.....

1 mark

(ii) **On the lines below**, put the **four** metals in the order of how strongly they react with the acid.

most reactive .....

.....

.....

least reactive .....

1 mark

(b) Choose the name of a metal from the box below to answer each question.

copper	**iron**	**magnesium**	**zinc**

(i) Which metal from the box burns with a bright white flame when reacted with oxygen in the air?

.....

1 mark

(ii) Which metal from the box goes rusty?

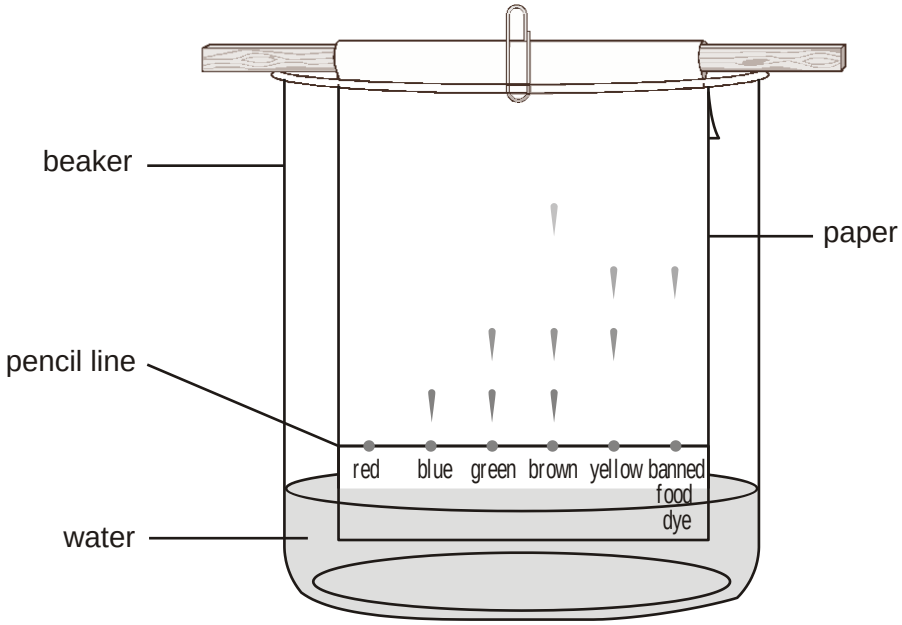
.....

1 mark

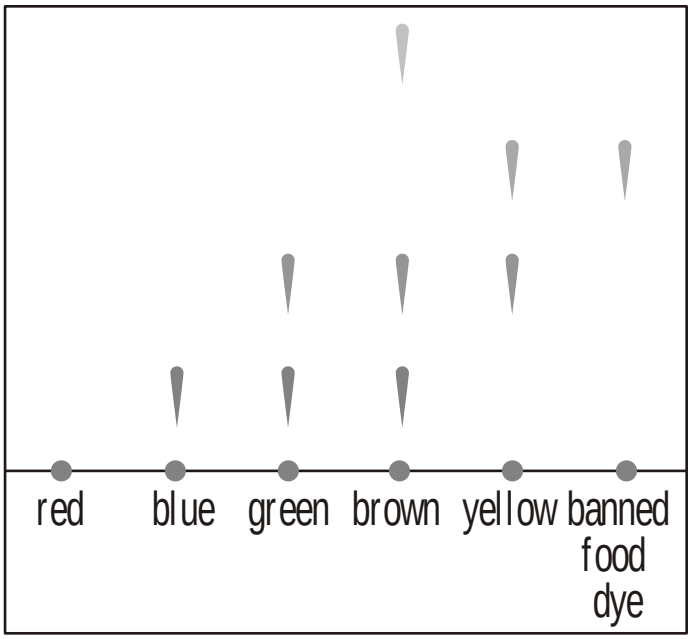
maximum 4 marks

5. Gary wanted to find out if some food colourings contained a banned food dye.

He put a drop of each food colouring and the banned food dye onto some special paper.
He hung the paper in a beaker of water.



After 10 minutes, the banned food dye and some of the dyes from the food colourings had moved up the paper.
Gary's results are shown below.



(a) Gary wrote the labels on the paper in pencil.
Why should he **not** write them in ink?

.....

.....

1 mark

(b) Look at Gary's results.
The different dyes in some of the food colourings had moved up the paper.

(i) Which food colouring contained the banned food dye?

.....

1 mark

(ii) Which food colouring contained the most dyes?

.....

1 mark

(c) Which food colouring did **not** dissolve in the water?

.....

1 mark

(d) Which method did Gary use to separate the dyes?
Tick the correct box.

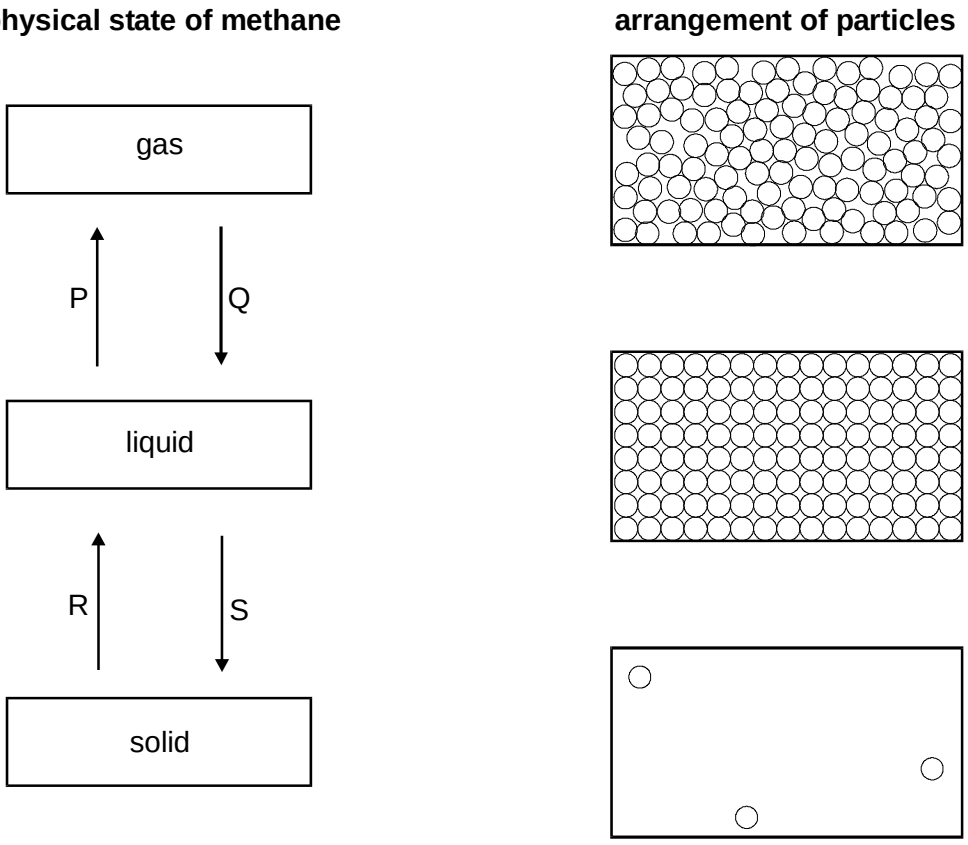
chromatography	☐	distillation	☐
evaporation	☐	filtration	☐

1 mark

maximum 5 marks

6. (a) Methane can be a gas, a liquid or a solid. In the diagram below, arrows P, Q, R and S represent changes of state.

The boxes on the right show the arrangement of particles of methane in the three different physical states.
Each circle represents a particle of methane.



(i) Draw a line from each physical state of methane to the arrangement of particles in that physical state.
Draw only **three** lines.

1 mark

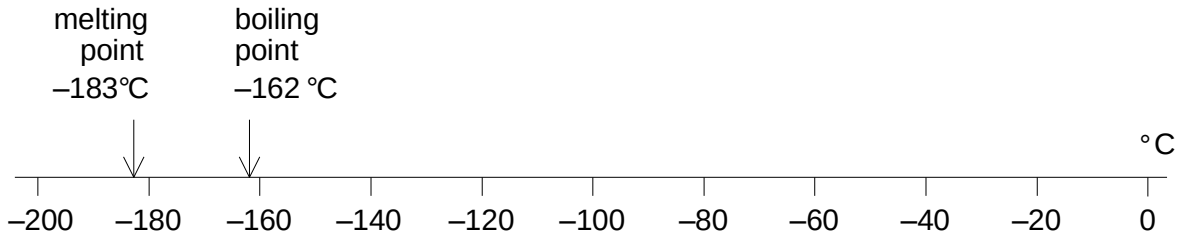
(ii) Arrows P, Q, R and S represent changes of state.
Which arrow represents:

evaporation? .....

melting? .....

2 marks

(b) Methane is the main compound in natural gas. The scale below shows the melting point and the boiling point of methane.



Methane has three physical states: solid, liquid and gas.

(i) What is the physical state of methane at –170°C?

.....

1 mark

(ii) The formula of methane is CH_4. The symbols for the two elements in methane are C and H.

Give the names of these two elements.

element C .....

element H .....

2 marks

(iii) When methane burns, it reacts with oxygen.
One of the products is water, H_2O.

Give the name of the other product.

.....

1 mark

Maximum 7 marks

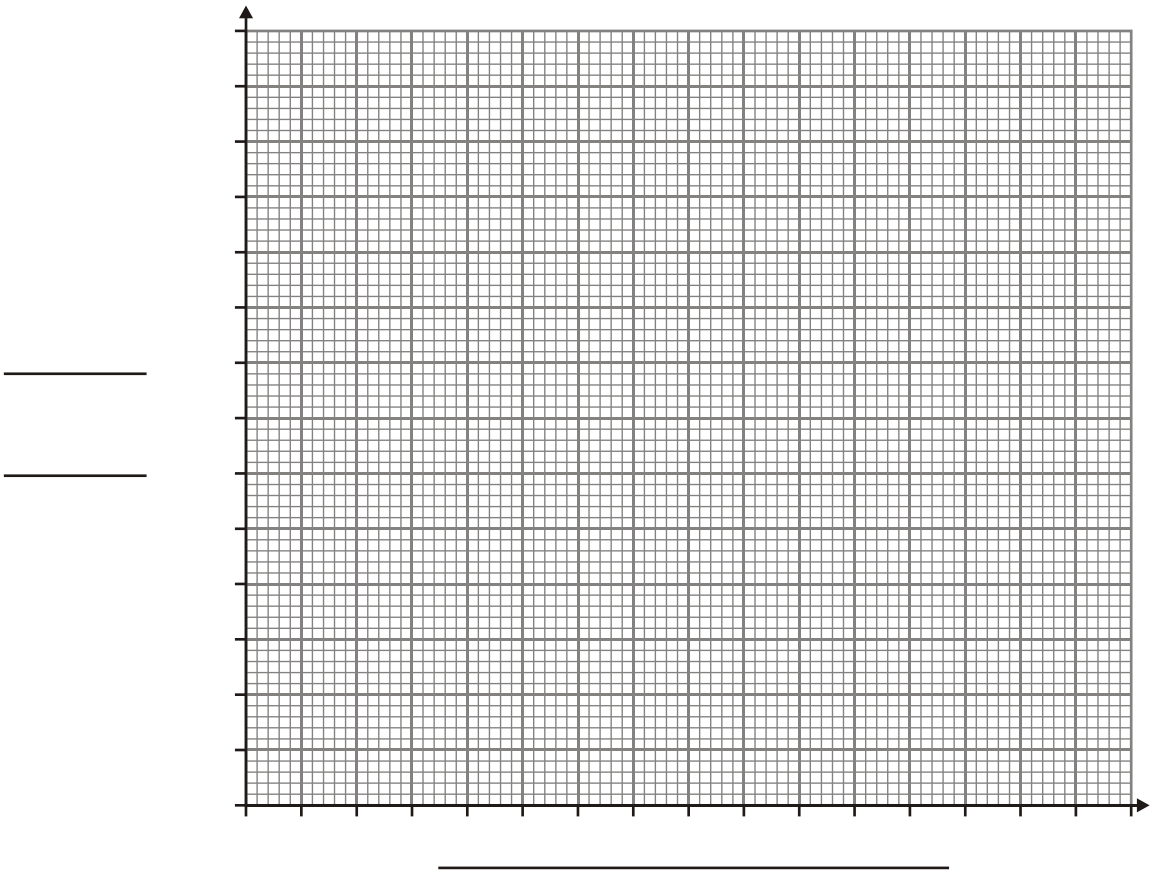
7. Six groups of pupils burned magnesium in air. The magnesium reacted with oxygen to form magnesium oxide.

They recorded the mass of magnesium used and the mass of magnesium oxide formed. Their results are shown in the table.

group	mass of magnesium (g)	mass of magnesium oxide (g)
A	3.2	5.2
B	3.8	6.5
C	4.2	7.0
D	4.9	8.6
E	5.4	8.0
F	6.1	10.7

(a) Use their results to draw a graph below.

- Decide the scale for each axis.
- Label the axes.
- Plot the points.
- Draw a line of best fit.



4 marks

(b) (i) Which group's results do **not** fit the general pattern?
Give the letter.

1 mark

(ii) How should the class deal with this 'odd' result?

.....

.....

1 mark

(c) Use the graph to predict the mass of magnesium oxide that will be formed by burning 7.0 g of magnesium.

..... 9

1 mark

(d) The results show the relationship between the mass of magnesium and the mass of magnesium oxide formed.

What conclusion could you draw about this relationship?

.....

.....

.....

.....

1 mark

maximum 8 marks

8. Part of the reactivity series of metals is shown below.

most reactive	potassium
	sodium
	magnesium
	aluminium
	iron
	lead
least reactive	copper

(a) Dan added a piece of magnesium to a solution of copper sulphate.
A displacement reaction took place.

The word equation for the reaction is shown below.

magnesium + copper sulphate $\rightarrow$ magnesium sulphate + copper

Why is this called a displacement reaction?

.....

.....

1 mark

(b) Look at each pair of chemicals in the table below.

Use the reactivity series to predict whether a displacement reaction would take place.
Write **yes** or **no** in the second column and give the reason for your decision.

pairs of chemicals	**Does a displacement reaction take place? yes or no**	**reason**
iron + sodium chloride		
magnesium + lead nitrate		

2 marks

(c) Dan wanted to find out where zinc should be placed in the reactivity series.

(i) What tests should Dan do to find the correct position of zinc in the reactivity series?

.....

.....

.....

1 mark

(ii) How would Dan use his test results to decide where to put zinc in the reactivity series?

.....

.....

.....

1 mark

maximum 5 marks