

Section B

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

- 4** The table lists the solubility in cold water of various substances.

substance	solubility in cold water
ammonium chloride	soluble
calcium nitrate	soluble
calcium sulfate	insoluble
lead(II) carbonate	insoluble
lead(II) chloride	insoluble
silver nitrate	soluble
silver carbonate	insoluble
sodium carbonate	soluble
sodium chloride	soluble
sodium hydroxide	soluble
sulfuric acid	soluble

- (a)** Which **two** of these substances when dissolved in water can be mixed to form a precipitate of calcium carbonate?

substance

substance

[1]

- (b)** Which **two** of these substances when dissolved in water can be mixed to form an aqueous solution of sodium sulfate?

substance

substance

[1]

- (c)** Which **two** of these substances produce ammonia gas when heated together?

substance

substance

[1]

- (d) How could you prepare a pure dry sample of powdered calcium carbonate from the mixture resulting from (a)?

.....
.....
.....
..... [3]

- (e) (i) What colour change is observed when aqueous sodium hydroxide is mixed with Universal Indicator solution?

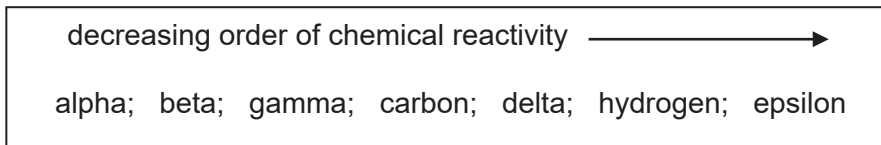
..... [1]

- (ii) Write the formula of the ion that causes the colour change in (e) (i).

..... [1]

- 5 (a)** A story describes a country where metallic elements are represented by unusual code names.

The story gives the chemical reactivity series for five of these metals, but includes the non-metals hydrogen and carbon. The series, including code names, is given as shown.



Use any of the code names to answer the questions.

- (i)** Which metal will not corrode in moist air?

..... [1]

- (ii)** Which elements will produce gamma metal when heated strongly with gamma oxide?

..... [1]

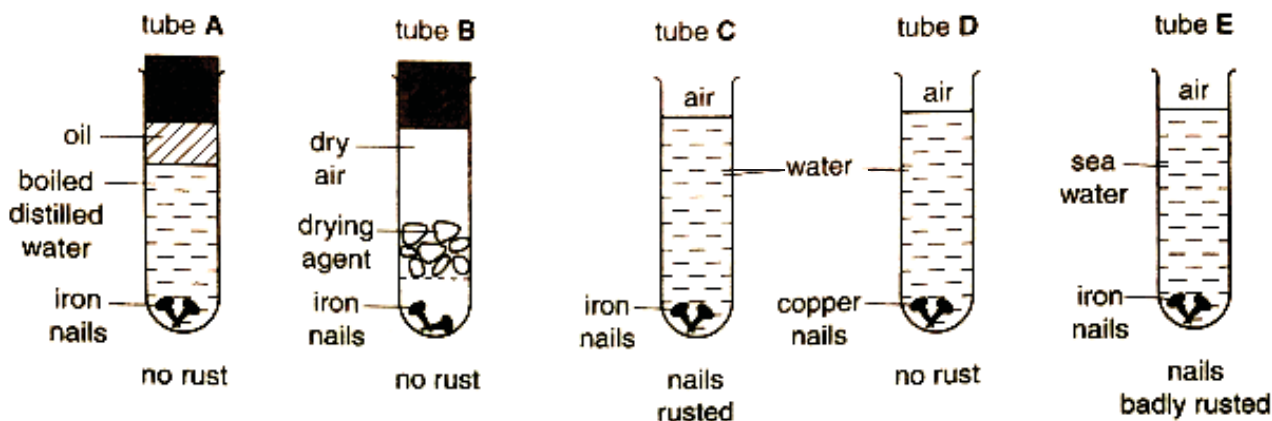
- (iii)** Which metal will react most slowly with hydrochloric acid, forming hydrogen gas?

..... [1]

- (iv)** Which of the code names is most likely to represent 'copper' ?

..... [1]

(b) A student set up an experiment to show what is needed for iron rust to be formed. The diagrams show the results of the experiment after one month.



(i) Which tube contained no water?

..... [1]

(ii) What do the results in tube C and tube D show?

.....
 [1]

(iii) Rust appeared in tube C. Which substance in air is essential for rusting to take place?

..... [1]

(iv) Iron machinery left near a sea shore rusts far more quickly than iron machinery left inland.

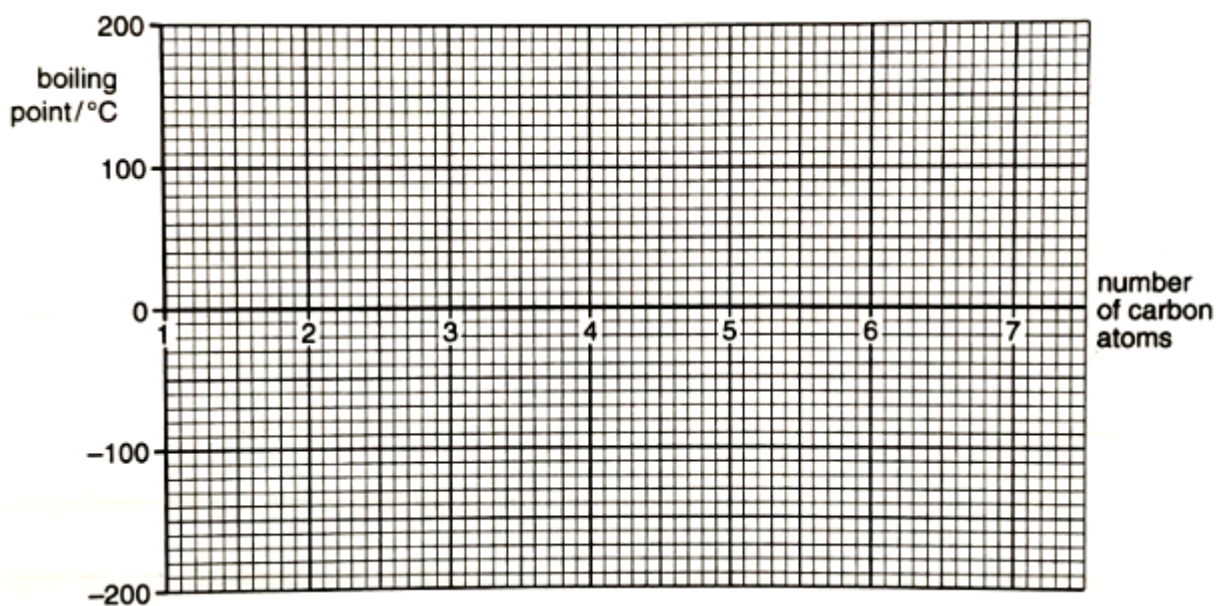
How do the results of this experiment support this observation?

.....
 [1]

- 6 The table shows some of the properties of the first six members of the homologous series of alkanes.

name	formula	number of carbon atoms in one molecule	boiling point / °C	state at room temperature
methane	CH ₄	1	-160	gas
ethane	C ₂ H ₆	2	-90	gas
propane	C ₃ H ₈	3	-40	gas
butane	C ₄ H ₁₀	4	0	
pentane	C ₅ H ₁₂	5	35	liquid
hexane	C ₆ H ₁₄	6	70	

- (a) Complete the table to show the 'state at room temperature' for butane and hexane. [1]
hexane.
- (b) Use the table to predict the formula of the alkane, decane, which has ten carbon atoms.
..... [1]
- (c) (i) Plot a graph of boiling point against number of carbon atoms for the six alkanes shown.



[2]

- (ii) Use the graph to predict the boiling point of heptane, which has seven carbon atoms.
..... [1]

- (d) Petrol contains an alkane with eight carbon atoms in its molecule. Draw the structural formula of this alkane.

[1]

- (e) Ethene reacts with bromine, Br₂.

(i) Name the type of reaction that takes place.

..... [1]

(ii) Write the chemical equation for this reaction.

..... [1]

End of Paper