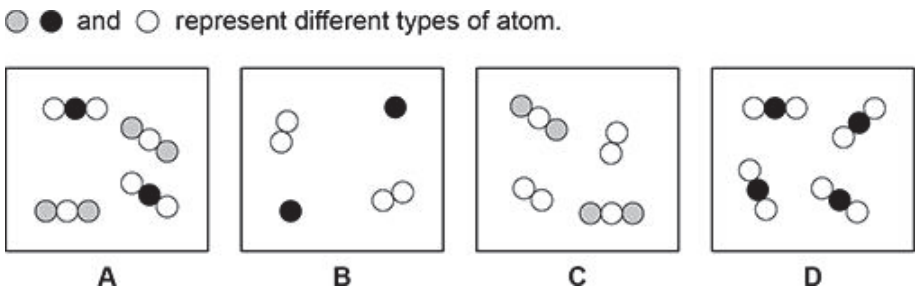
All questions are for separate science students only

Q1.

This question is about elements, compounds and mixtures.

Figure 1 shows diagrams which represent the atoms and molecules in different substances.

Figure 1



(a) Which diagram in **Figure 1** represents a pure compound?

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

(1)

(b) Which diagram in **Figure 1** represents a mixture of an element and a compound?

Tick (✓) **one** box.

A ☐ B ☐ C ☐ D ☐

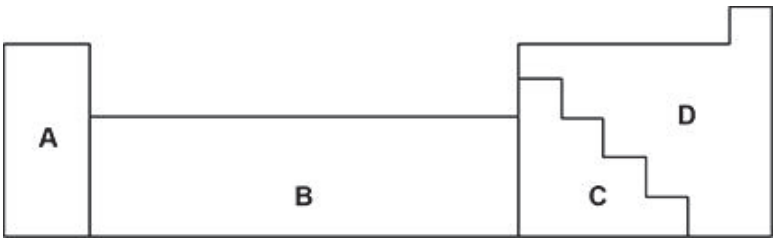
(1)

(c) Elements are metals or non-metals.

Figure 2 shows an outline of the periodic table.

The periodic table is divided into sections.

Figure 2



Where are metals found in the periodic table?

Tick (✓) **one** box.

Section **A** only ☐

Sections **A**, **B** and **C** ☐

Sections **B**, **C** and **D** ☐

Section **D** only ☐

(1)

(d) Which **two** of the following are typical properties of a transition metal? **(chemistry only)**

Tick (✓) **two** boxes.

Can be bent and shaped ☐

Good conductor of electricity ☐

Low density ☐

Low melting point ☐

Poor conductor of heat ☐

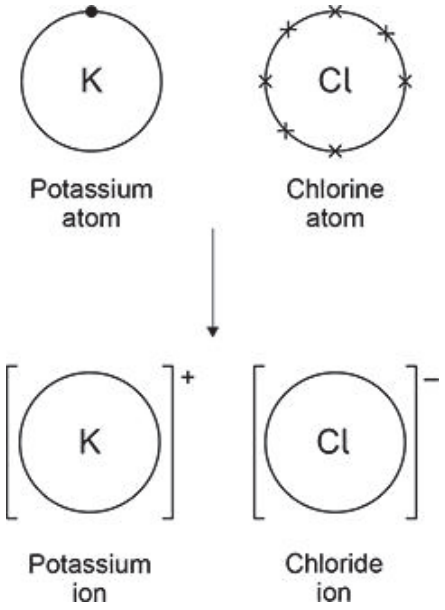
(2)

(e) Potassium and chlorine react to produce potassium chloride.

An atom of potassium loses an electron to form a potassium ion.

An atom of chlorine gains an electron to form a chloride ion.

Complete the dot and cross diagram.

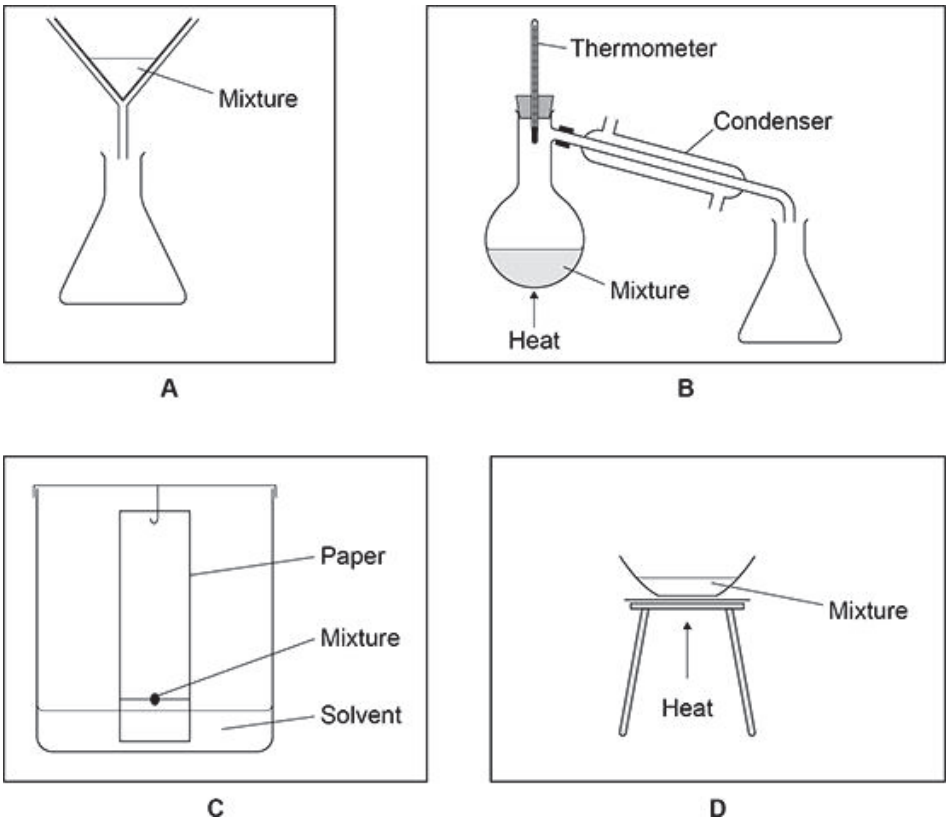


(2)

Mixtures are separated by different methods.

Figure 3 shows the apparatus for separating four different types of mixture.

Figure 3



(f) Which apparatus could be used to collect water from sodium chloride solution?

Use **Figure 3**.

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(g) Which apparatus shows filtration?

Use **Figure 3**.

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(Total 9 marks)

Q2.

This question is about metals.

(a) Platinum is used to make jewellery.

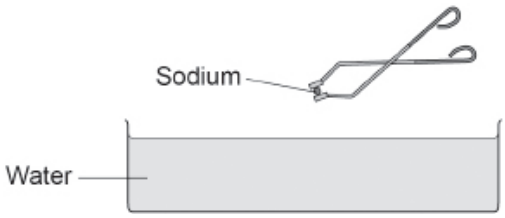
Suggest **one** reason why platinum is used to make jewellery.

_____

_____

(1)

(b) The figure below shows a piece of sodium being added to water.



Give **two** observations that could be seen when sodium is added to water.

1 _____

_____

2 _____

_____

(2)

(c) Copper is a transition element.

Sodium is a Group 1 element.

What are **two** differences between copper and sodium? **(chemistry only)**

Tick (✓) **two** boxes.

Copper has a lower melting point.	☐
Copper is harder.	☐
Copper is less dense.	☐
Copper is less reactive.	☐
Copper is less strong.	☐

(2)

(d) The metals aluminium and copper can be used to make pans for cooking.

The table below shows information about the two metals.

The higher the value for thermal conductivity, the better the metal conducts thermal energy.

	Aluminium	**Copper**
Thermal conductivity in arbitrary units	250	400
Density in g/cm^3	2.7	8.9
Cost of metal per kg in £	1.50	7.00

Evaluate the use of pans made of aluminium and of copper.

Use the table.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

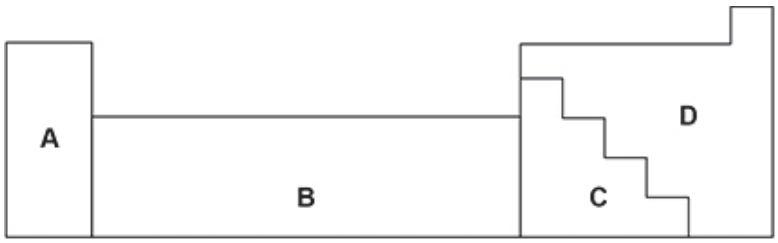
(Total 9 marks)

Q3.

This question is about metals and non-metals.

Figure 1 shows an outline of part of the periodic table.

Figure 1



(a) Element **Q** is a dull solid with a melting point of 44 °C.

Element **Q** does not conduct electricity.

Which section of the periodic table in **Figure 1** is most likely to contain element **Q**?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(b) Element **R** forms ions of formula R^{2+} and R^{3+}

Which section of the periodic table in **Figure 1** is most likely to contain element **R**?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(c) Give **two** differences between the physical properties of the elements in Group 1 and those of the transition elements. **(chemistry only)**

1 _____

_____

2 _____

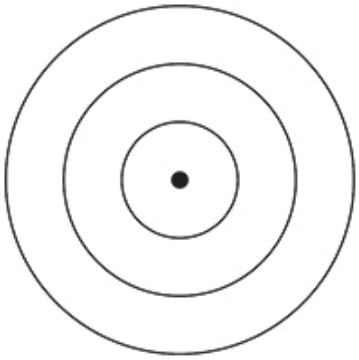
_____

(2)

(d) Complete **Figure 2** to show the electronic structure of an aluminium atom.

Use the periodic table.

Figure 2



(1)

(e) Aluminium is a metal.

Describe how metals conduct electricity.

Answer in terms of electrons.

_____

_____

_____

_____

_____

_____

(3)

(f) Name the type of bonding in compounds formed between metals and non-metals.

_____

(1)

(g) Magnesium oxide is a compound formed from the metal magnesium and the non-metal oxygen.

Describe what happens when a magnesium atom reacts with an oxygen atom.

You should refer to electrons in your answer.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(Total 13 marks)