Chemistry unit 1 homework – Atomic structure and the periodic table

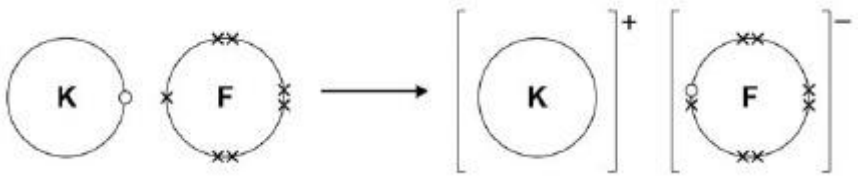
For each of the questions below: -

Highlight the command word if there is one & annotate what the command word means. - Answer the question!

Q1. Potassium reacts with fluorine to produce the ionic compound potassium fluoride (KF).

Figure 3 shows the transfer of electrons during the reaction.

Figure 3



(d) Describe what happens when potassium reacts with fluorine to produce potassium fluoride.

Write about electron transfer in your answer.

(5)

(e) Potassium fluoride is an ionic compound.

Explain why ionic compounds have high melting points.

Use the following words in your answer:

- attraction
- energy
- ions.

(4)

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Q2 Three substances are all solid at room temperature.

The table describes tests and the result of each test on the three substances.

Substance	**Effect of large force applied**	**Effect of heating gently at first, then strongly**	**Effect of passing electricity through solid**	**Effect of passing electricity through liquid**
A	Breaks into many pieces	Easily melts and then boils	Does not conduct	Does not conduct
B	Breaks into many pieces	No change	Does not conduct	Conducts
C	Becomes thinner	No change	Conducts	Conducts

(a) The covalent bonds in the molecules are not overcome when substance **A** is heated.

What forces are overcome when substance **A** melts?

_____

(1)

(b) What could substance **A** be?

Tick **one** box.

Graphite ☐

Iron ☐

Sodium chloride ☐

Sulfur ☐

(1)

(c) Suggest why substance **B** conducts electricity as a liquid but does **not** conduct electricity as a solid.

_____

_____

_____

_____

_____

_____

(3)

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(d) Suggest why substance **C** becomes thinner when a large force is applied.

_____

_____

_____

_____

(2)

(e) What could substance **C** be?

Tick **one** box.

Copper	☐
Diamond	☐
Iodine	☐
Magnesium oxide	☐

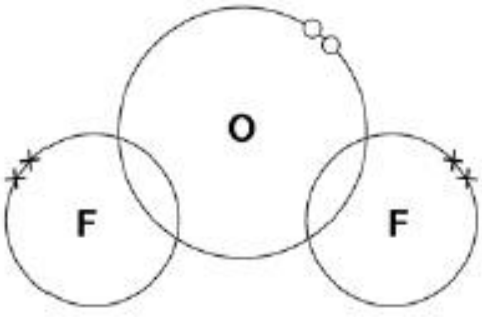
(1)

Q3. This question is about oxygen.

(a) One oxygen atom shares one pair of electrons with each fluorine atom in oxygen difluoride (OF_2).

Complete the dot and cross diagram of oxygen difluoride below.

You should show only the electrons in the outer shells.



(2)

(b) Oxygen difluoride (OF_2) has a melting point of – 224 °C and a boiling point of –145 °C

What is the state of oxygen difluoride at room temperature?

_____

(1)

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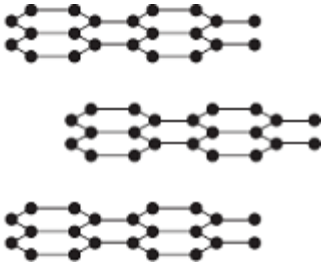
Q4 The diagrams show the structures of diamond and graphite.

Diamond



Graphite

(a) Diamond and graphite both contain the same element.

What is the name of this element? _____

(1)

(b) Use the diagrams above and your knowledge of structure and bonding to explain why:

(i) graphite is very soft

_____

_____

_____

_____

(2)

(ii) diamond is very hard

_____

_____

_____

_____

(2)

(iii) graphite conducts electricity.

_____

_____

_____

_____

(2)