

## Chemistry unit 1 homework – Atomic structure and the periodic table

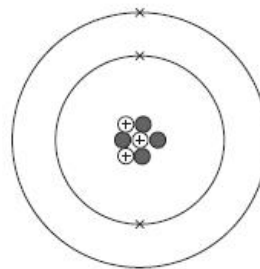
For each of the questions below: -

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

### Q1.

This question is about atomic structure.

The figure represents the structure of a lithium atom.



(a) Name the particle in the atom that has a positive charge.

(1)

(b) Name the particle in the atom that has the smallest mass.

(1)

(c) Complete the sentences.

Choose the answers from the box.

3	4	7	10
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The mass number of the lithium atom is \_\_\_\_\_.

The number of neutrons in the lithium atom is \_\_\_\_\_.

(2)

(d) Name the particle in the atom discovered by James Chadwick.

\_\_\_\_\_.

(1)

(e) An element has two isotopes.

The table shows information about the isotopes.

	Mass number	Percentage (%) abundance
Isotope 1	10	20
Isotope 2	11	80

Calculate the relative atomic mass ( $A_r$ ) of the element.

Give your answer to 1 decimal place.

\_\_\_\_\_

\_\_\_\_\_

Relative atomic mass ( $A_r$ ) = \_\_\_\_\_

(2)

## Chemistry unit 1 homework – Atomic structure and the periodic table

For each of the questions below: -

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- (f) The radius of an atom is 0.2 nm

The radius of the nucleus is  $\frac{1}{10000}$  the radius of the atom.

Calculate the radius of the nucleus.

Give your answer in standard form.

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Radius = \_\_\_\_\_ nm

(2)

### Q2.

Figure 1 shows an outline of the modern periodic table.

Figure 1

The figure shows an outline of the periodic table with the following elements marked:

- J**: Located in the 2nd period, 18th group (Noble gases).
- L**: Located in the 2nd period, 2nd group (Alkaline earth metals).
- M**: Located in the 3rd period, 11th group (Transition metals).
- Q**: Located in the 3rd period, 17th group (Halogens).
- R**: Located in the 4th period, 1st group (Alkali metals).

J, L, M, Q and R represent elements in the periodic table.

- (a) Which element has four electrons in its outer shell?

Tick (✓) **one** box.

J     L     M     Q     R

(1)

- (b) Which **two** elements in **Figure 1** are in the same period?

\_\_\_\_\_ and \_\_\_\_\_

(1)

- (c) Which element reacts with potassium to form an ionic compound? **(1)**

Tick (✓) **one** box.

J     L     M     Q     R

## Chemistry unit 1 homework – Atomic structure and the periodic table

For each of the questions below: -

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- (d) Which element forms ions with different charges?

Tick (✓) **one** box.

J     L     M     Q     R

(1)

- (e) Which element has three electron shells?

Tick (✓) **one** box.

J     L     M     Q     R

(1)

- Q3** (a) The plum pudding model of the atom was replaced by the nuclear model.

The nuclear model was developed after the alpha particle scattering experiment.

Compare the plum pudding model with the nuclear model of the atom.

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(4)

- Q4.** This question is about the halogens (Group 7).

- (a) How do the boiling points of the halogens change down the group from fluorine to iodine?

\_\_\_\_\_ (1)

- (b) Sodium bromide is produced by reacting sodium with bromine.

Sodium bromide is an ionic compound.

- (i) Write down the symbols of the **two** ions in sodium bromide.

\_\_\_\_\_ (1)

- (ii) Chlorine reacts with sodium bromide solution to produce bromine and one other product.

Complete the word equation for the reaction.

chlorine + sodium bromide  $\rightarrow$  bromine + \_\_\_\_\_ (1)

## Chemistry unit 1 homework – Atomic structure and the periodic table

For each of the questions below: -

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- (iii) Why does chlorine displace bromine from sodium bromide?

\_\_\_\_\_  
\_\_\_\_\_ (1)

**Q5.** Sodium is a Group 1 element.

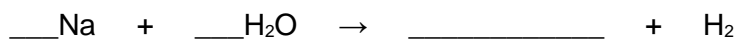
- (a) (i) A small piece of sodium is added to some water containing Universal Indicator solution.

Describe what you would **see** happening.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(3)

- (ii) Complete **and** balance the equation for the reaction of sodium with water.



(2)

- (b) Francium is the most reactive element in Group 1.

Explain why in terms of electronic structure.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(3)

- (c) The transition elements have different properties from the elements in Group 1.

Give **two** of these different properties of transition elements.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

(2)