Worksheet 2.4

Atomic structure

1 **a** Complete these sentences by deleting the incorrect word in each pair.

Atoms of the same element have the same number of **protons / neutrons**. The number of **protons / neutrons** in an atom is called its **proton / mass** number. The number of protons plus the number of **electrons / neutrons** in an atom gives the **atomic / nucleon** number. As an atom is neutral, the number of negative **electrons / neutrons** in an atom is always the same as the number of positive protons in the nucleus.

b Complete the following sentences using the words below to fill the gaps.

eight **electrons** **closest** **energy** **shells**

The ..... in an atom are not free to move where they like. They can only occur at fixed distances from the nucleus in electron ..... (or ..... levels).

The first shell, ... to the nucleus, can only take two electrons, while the second shell can take up to ..... electrons.

2 For each of these atoms of the following elements, give the proton number (atomic number) and the nucleon number (mass number).

a helium (He) has 2 protons, 2 neutrons and 2 electrons .....

b fluorine (F) has 9 protons, 10 neutrons and 9 electrons .....

c iron (Fe) has 26 protons, 30 neutrons and 26 electrons .....

d uranium (U) has 92 protons, 140 neutrons and 92 electrons .....

3 **a** Complete the table below to show the subatomic particles present in these atoms.

Element	Protons	Neutrons	Electrons	Nucleon number
Li		4		7
Na			11	23
P	15			31
Pb			82	207

b Chlorine atoms come in two forms: $^{35}_{17}Cl$ and $^{37}_{17}Cl$.

i How do you know that they are both atoms of the same element?

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ii What is the difference between the two types, or isotopes, of chlorine?

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iii Which element is $^{14}_{6}X$ an isotope of?

$^{12}_{6}C$ $^{14}_{7}C$

Explain your answer.

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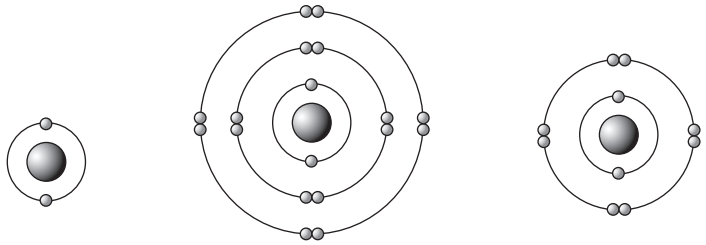

a Diagrams **A**, **B** and **C** represent the atoms of three elements. Name the elements.

A.....**B**.....**C**.....

b These elements are all very unreactive gases. What can be said about the electron arrangements of these atoms?

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