

Combined science - Physics - Key stage 4 - Atomic Structure

# Isotopes and Ionisation

Mr van Hoek



# How much can you recall?

Describe the nuclear model of the structure of an atom.

In your answer you should:

- Give details of the individual particles that make up an atom.
- Include the relative masses and relative charges of these particles.

Do **not** include a diagram in your answer.



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# Independent task - part 1 of 2

1. What is the definition of an isotope?
2. How can you determine the number of neutrons in an isotope?
3. What does the number of protons determine about an atom?



## Independent task - part 2 of 2

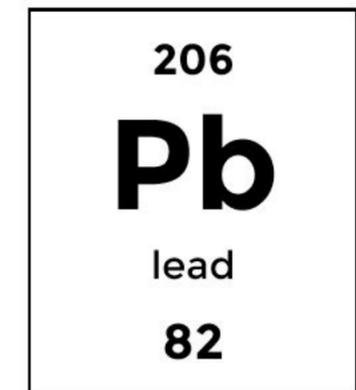
4. Uranium has two natural isotopes, uranium-235 and uranium-238.

Use the correct answer from the words below to complete the sentence.

**electrons    neutrons    protons**

The nucleus of a uranium-238 atom has three more \_\_\_\_\_ than the nucleus of a uranium-235 atom.

5. How many protons are there in the nucleus of a lead-206 atom?



6. How many neutrons are there in the nucleus of a lead-206 atom?



# Complete the sentences about atoms.

In an atom, the number of electrons is equal to the number of \_\_\_\_\_ .

All atoms of an element have the same number of \_\_\_\_\_ .

Isotopes of the same element have different numbers of \_\_\_\_\_ .

*Exam Question taken from ExamPro*



# A question about isotopes

Americium 241 is an isotope of Americium.

Which of the isotopes given in the table below is **not** an isotope of americium?

Isotope	Mass number	Atomic number
A	243	95
B	243	94
C	242	95

*Exam Question taken from ExamPro*



# Exam question about ionisation

What happens to the structure of an atom when the atom is ionised?

*Exam Question taken from ExamPro*

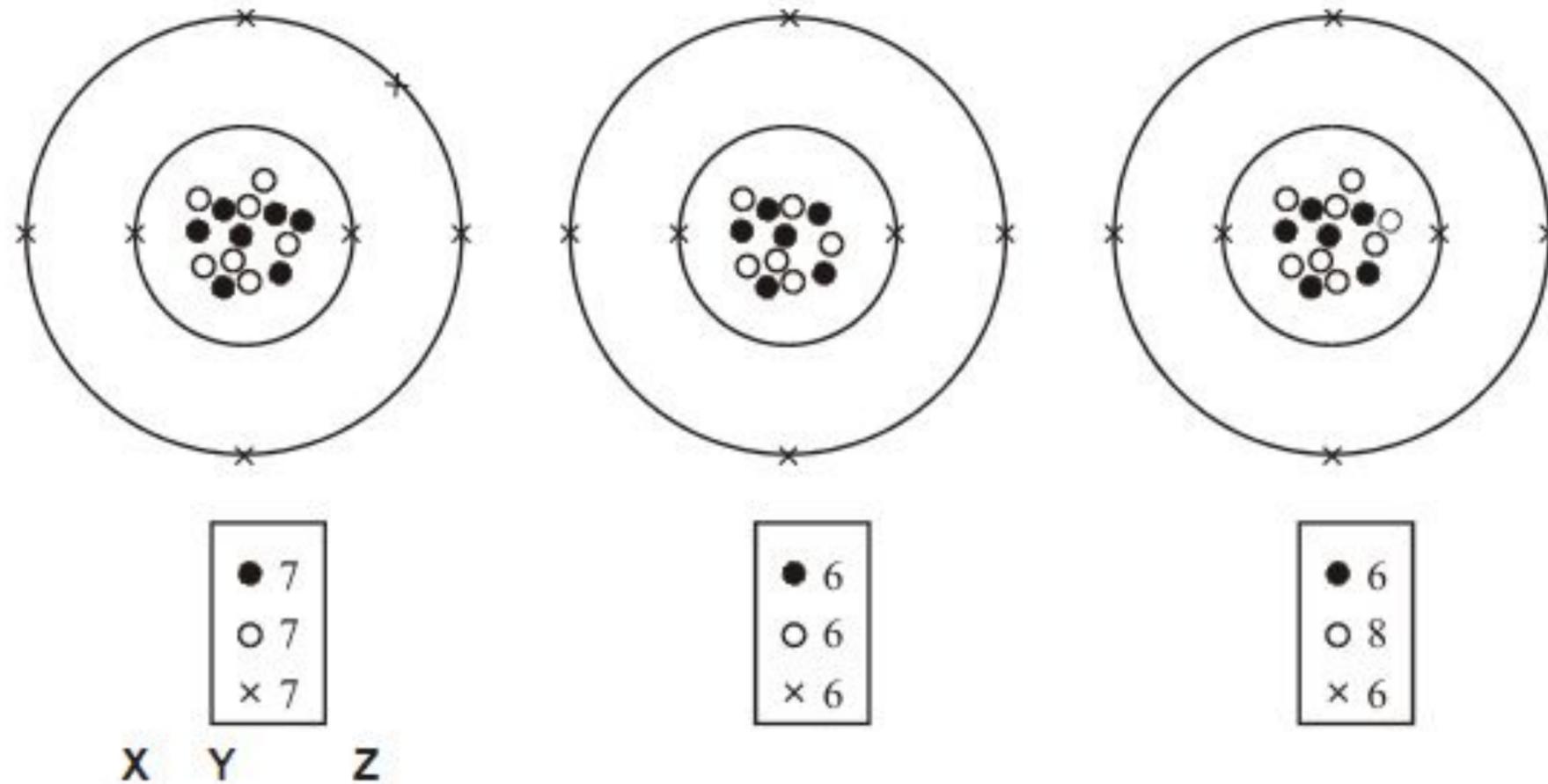


# Exam question about isotopes

The diagrams represent three atoms **X**, **Y** and **Z**.

Which **two** of the atoms are from the same element?

Give a reason for your answer.



*Exam Question taken from ExamPro*



# Exam question about energy levels

Bank notes have a special ink added to them to which makes parts of them glow when ultraviolet light is shone on them.

Use some of the statements below to create an explanation, adding a number next to the statements you wish to use. The first is done for you.

	...and move to higher energy levels.
1	When UV light is absorbed, ...
	... visible light (EM radiation) is emitted, ...
	When electrons fall back down (relax), ...
	...the electrons in the atoms in the ink are excited ...
	... which is why the ink glows.



# Independent task

Within the nuclear industry, workers must be protected from ionising radiation. Ionising radiation can cause ionisation to occur within the chemicals of cells, and this increases risks to workers' health.

Explain what is meant by ionisation.

Describe how the process of ionisation occurs.

