

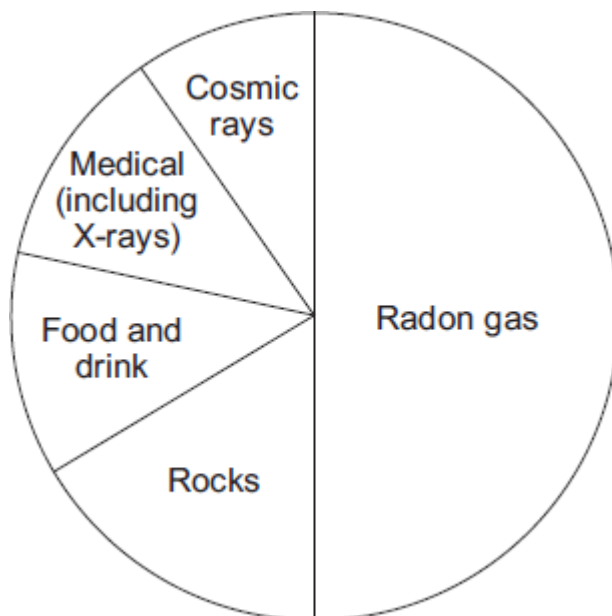
Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

The pie chart shows the average proportions of background radiation from various sources in the UK.



Three sources of background radiation are given in **List A**.
Statements about sources of background radiation are given in **List B**.

Draw **one** line to link each source of background radiation in **List A** to the statement about that source given in **List B**.

Draw only **three** lines.

List A

List B

X-rays

Are used to show broken bones.

The radiation comes from outer space.

Cosmic rays

Radon gas

Comes from soil containing a radioactive isotope of potassium.

Gives about 50 % of all background radiation.

(Total 3 marks)

Q2.

Some rocks inside the Earth contain a radioactive element, uranium-238. When an atom of uranium-238 decays, it gives out an alpha particle.

- (a) The following statement about alpha particles was written by a student.
The statement is **not** correct.

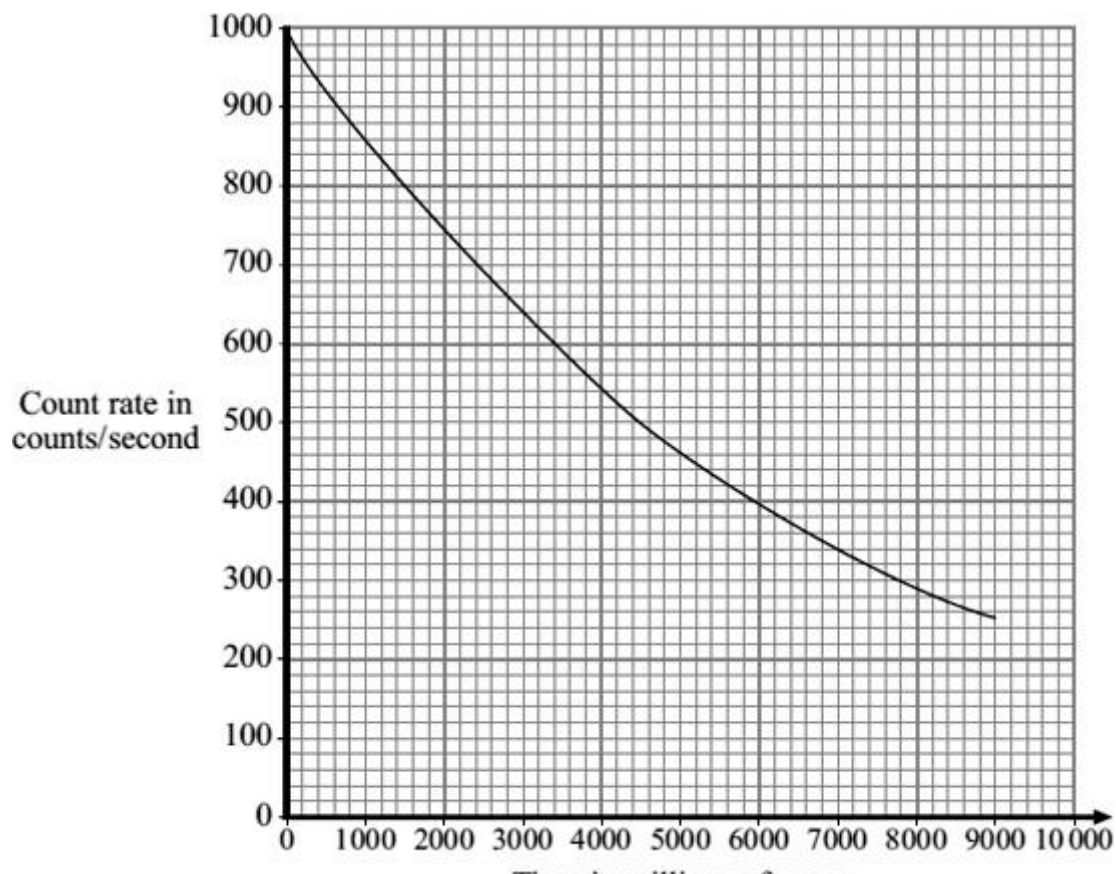
Alpha particles can pass through a very thin sheet of lead.

Change **one** word in the statement to make it correct.

Write down your **new** statement.

(1)

- (b) The graph shows how the count rate from a sample of uranium-238 changes with time.



The graph can be used to find the half-life of uranium-238. The half-life is 4 500 million years.

- (i) Draw on the graph to show how it can be used to find the half-life of uranium -238.

(1)

- (ii) There is now half as much uranium-238 in the rocks as there was when the Earth was formed.

How old is the Earth?

Draw a ring around your answer.

2250 million years

4500 million years

9000 million years

(1)

- (iii) If a sample of uranium-238 were available, it would not be possible to measure the half-life in a school experiment.

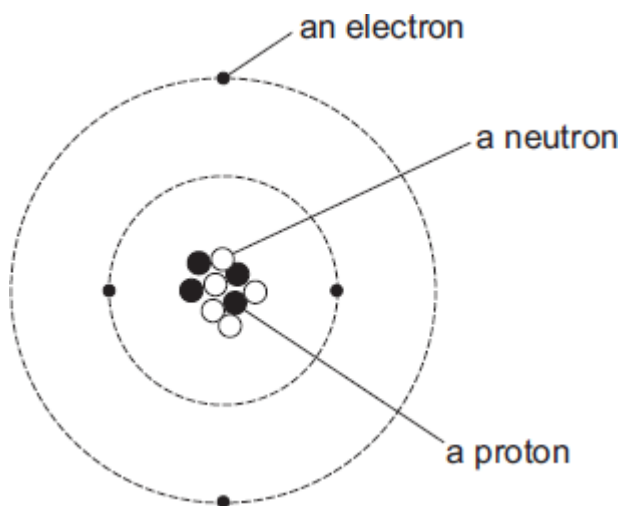
Explain why.

(2)

(Total 5 marks)

Q3.

The diagram represents an atom of beryllium. The three types of particle that make up the atom have been labelled.



- (a) Use the labels from the diagram to complete the following statements.

Each label should be used once.

The particle with a positive charge is _____

The particle with the smallest mass is _____

The particle with no charge is _____

(2)

- (b) What is the atomic number of a beryllium atom?

Draw a ring around your answer.

4	5	9	13
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Give a reason for your answer.

(2)

- (c) Which **one** of the following statements describes what can happen to an atom to change it into an ion?

Tick (✓) **one** box.

The atom loses a neutron.

☐

The atom loses an electron.

☐

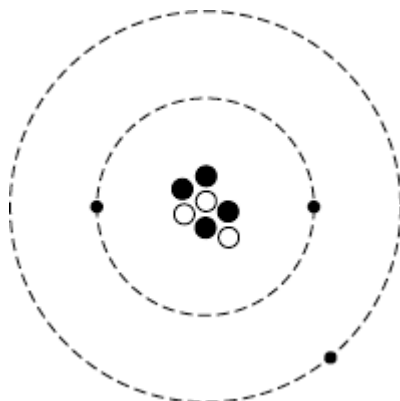
The atom loses a proton.



(1)
(Total 5 marks)

Q4.

The diagram represents an atom of lithium.



- (a) (i) Complete the following table of information for an atom of lithium.

Number of protons	
Number of electrons	
Number of neutrons	

(2)

- (ii) What is the mass number of a lithium atom?

Draw a ring around your answer.

3	4	7	10
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Give a reason for your answer.

(2)

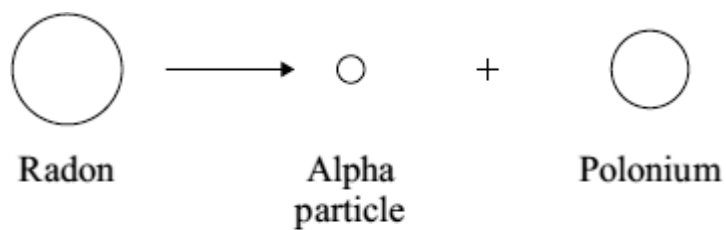
- (b) Complete the following sentence by drawing a ring around the correct line in the box.

An atom that has lost an electron is called

an ion
an isotope
a positive atom

(1)

- (c) When an alpha particle is emitted from the nucleus of a radon atom, the radon changes into polonium.



Not to scale

An alpha particle consists of 2 protons and 2 neutrons.

- (i) Complete the following sentence by drawing a ring around the correct line in the box.

The mass of a polonium atom is

greater than
the same as
smaller than

the mass of a radon atom.

(1)

- (ii) Give a reason for your answer to part (c)(i).

(1)

(Total 7 marks)