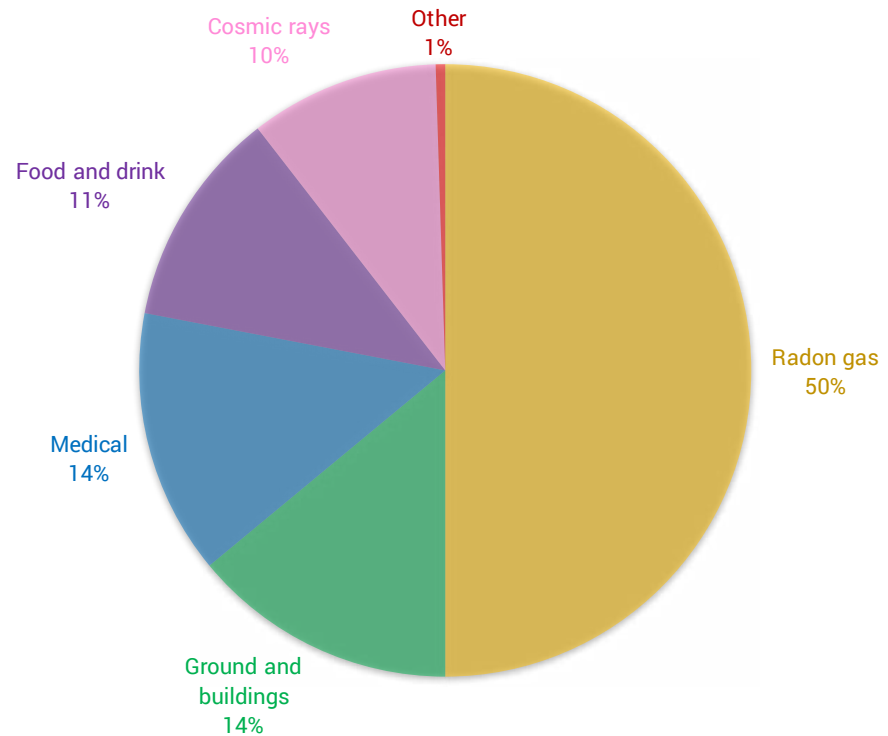| 0 | 1 |

The below pie chart shows the contribution to the total background radiation dose which the average person in the UK receives from a number of different sources.

Cosmic rays
10%

Other
1%

Food and drink
11%

Radon gas
50%

Medical
14%

Ground and
buildings
14%

| 0 | 1 | . | 1 |

Explain the meaning of the term background radiation.

_____

_____

[2 marks]

| 0 | 1 | . | 2 |

As shown, radon gas is the single largest contributor to the background radiation dose which the average person in the UK receives. Explain the origin of radon gas.

_____

[1 mark]

| 0 | 1 | . | 3 |

Radon decays by alpha emission. Explain why radon gas is harmless outside the body, but can be quite dangerous when inhaled.

_____

_____

[2 marks]

| 0 | 1 | . | 4 |

Roughly 1% of the background radiation dose which the average person receives comes from 'Other' sources. Suggest what one of these sources might be.

_____

[1 mark]

| 0 | 2 |

In an A-level Physics class, Bilal is investigating the decay of a gamma source using a Geiger-Muller tube which has been connected to a ratemeter. He obtains the below data.

Time (minutes)	0	30	60	90	120
Count rate (counts per second)	104	75	54	39	29

When he places the source back into a lead box and hands it back to his teacher (who then stores it safely in another room), he notices that the count rate is still 4 per second.

| 0 | 2 | . | 1 |

Explain why the reading on the ratemeter was still 4 per second after the source was removed.

_____

[1 mark]

| 0 | 2 | . | 2 |

Why did Bilal place the source into a lead box when he had finished taking measurements?

_____

[1 mark]

| 0 | 2 | . | 3 |

Calculate the half-life of the source used.
Show all your working clearly in the space below.

Half-life = _____ minutes

[3 marks]