0 2 The nuclei of some isotopes are radioactive.

0 2 . 1 Which of the following statements could apply to a radioactive nucleus?

[1 mark]

Tick **one** box.

- The nucleus will emit an atom. ☐
- The nucleus will emit light. ☐
- The nucleus will emit a neutron. ☐
- The nucleus will emit sound. ☐

0 2 . 2 Potassium-40 is a radioactive isotope present in food, such as bananas.

The following equation shows how potassium-40 will decay into calcium-40

$$^{40}_{19}\text{potassium} \longrightarrow {}^{40}_{20}\text{calcium} + {}^{0}_{-1}\text{e}$$

Give one similarity and one difference between nuclei of potassium-40 and calcium-40

[2 marks]

Similarity _____

Difference _____

0 2 . 3 The activity of a sample of potassium-40 is measured 3 times.

The measurements are given below.

4906 Bq **4956 Bq** **4889 Bq**

Which of the following statements explains why the readings are different?

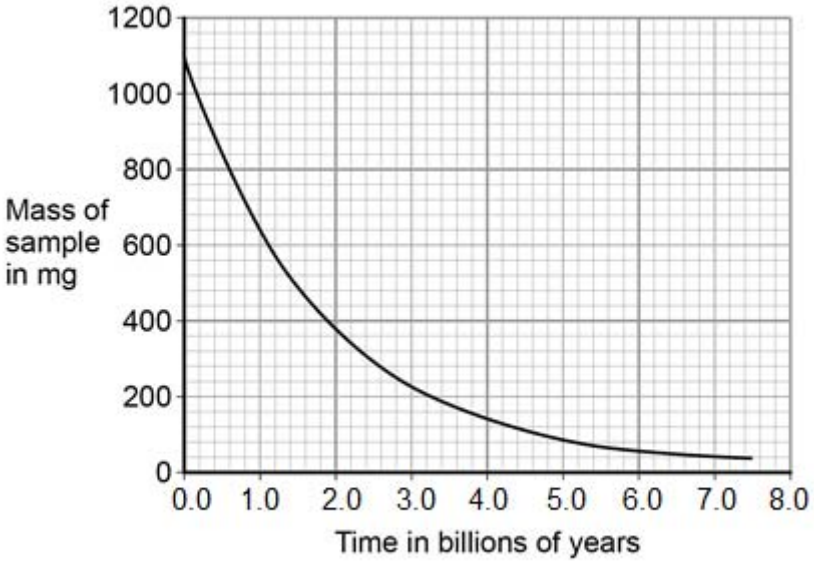
[1 mark]

Tick **one** box.

- Radioactive decay is constant. ☐
- Radioactive decay is hazardous. ☐
- Radioactive decay is random. ☐

0 2 . 4 **Figure 3** shows how the activity of a sample of potassium-40 changes over time.

Figure 3



Use **Figure 3** to determine the half-life of potassium-40.

[2 marks]

Half-life = _____ billion years

0 2 . 5 When food is eaten, some of the radiation the food emits is detectable outside the body.

Which type of radiation would not be detectable outside the body?

Tick **one** box.

[1 mark]

alpha ☐

beta ☐

gamma ☐

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	The nucleus will emit a neutron.		1	AO1/1 6.4.2.1
02.2	**<u>Similarity</u>** same mass number **<u>difference</u>** different atomic number	 allow same number of nucleons (protons + neutrons) allow different number of protons	 1 1	AO1/1 6.4.2.2
02.3	Radioactive decay is random.		1	AO1/1 6.4.2.3
02.4	1.3 (billion years)	allow 1.2-1.4 (billion years) allow **1** mark for horizontal line drawn from ~ 550	2	AO2/1 6.4.2.3
02.5	alpha		1	AO1/1 6.4.2.1
Total			**7**	