

**GCSE Physics A (Gateway)**

**J249/02 Physics A P5-P8 and P9 (Foundation Tier)**

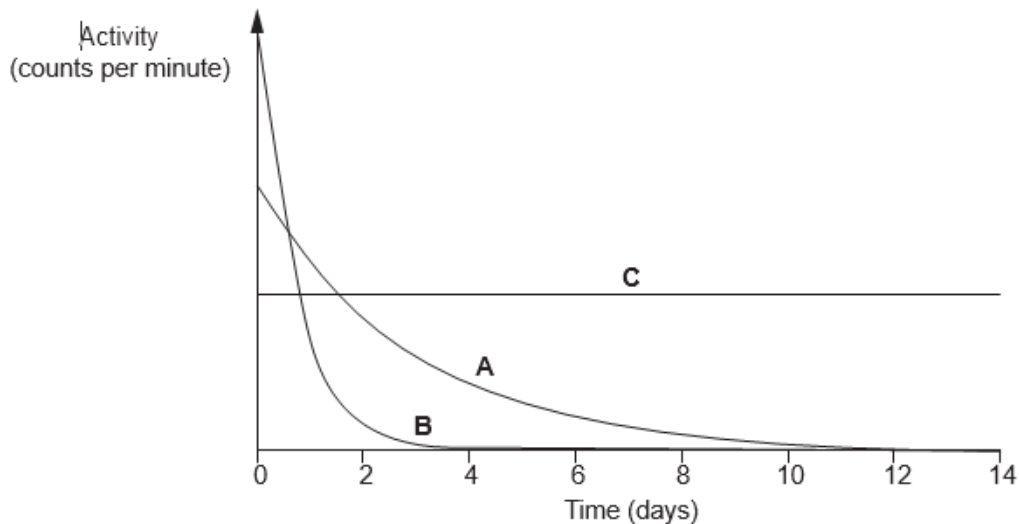
**Question Set 16**

- 1 (a) A radioactive isotope has a half-life of 6 hours.  
50 g of the isotope are put in a container.  
What mass of the isotope is left after 6 hours?

Mass = ..... g

[1]

- (b) This is a graph showing the radiation emitted from samples of three different isotopes **A**, **B** and **C**.



- (i) Which isotope, **A**, **B** or **C**, takes the longest time to decay?

Tick (✓) **one** box.

**A**

**B**

**C**

[1]

- (ii) Two scientists discuss the isotopes in the graph.

Scientist 1	Scientist 2
'I think isotope <b>A</b> is more hazardous than <b>B</b> . <b>A</b> has a higher activity than <b>B</b> .'	'I think isotope <b>B</b> is more hazardous than <b>A</b> . <b>B</b> has a longer half-life than <b>A</b> .'

Do you agree with the views of scientist 1 and scientist 2?

Use the graph and ideas about radioactivity and half-life to explain your answer.

[4]

(iii) **Scientist 1** wants to identify the type of radiation emitted by isotope **A**.

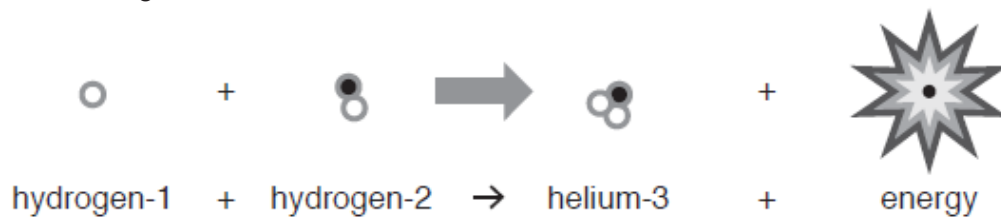
This is a list of equipment **Scientist 1** has in his laboratory:

- radiation detector
- piece of thick lead
- piece of cardboard
- piece of aluminium.

Describe how **Scientist 1** does the experiment and explain how they can work out the type of radiation emitted.

You may include a diagram in your answer.

(c) This is a diagram to show a nuclear fusion reaction: [4]



(i) Explain why this is nuclear fusion.

(ii) It is difficult for nuclear fusion reactions to occur on Earth. [1]

Explain why nuclear fusion reactions occur in the Sun.

(iii) What will happen to our Sun when it runs out of hydrogen? [2]

(d) Some scientists say nuclear fission is renewable. Other scientists say it is non-renewable. [1]

Suggest why the scientists disagree.

[1]

**Total Marks for Question Set 16: 15**

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