Oxford Cambridge and RSA

# 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.

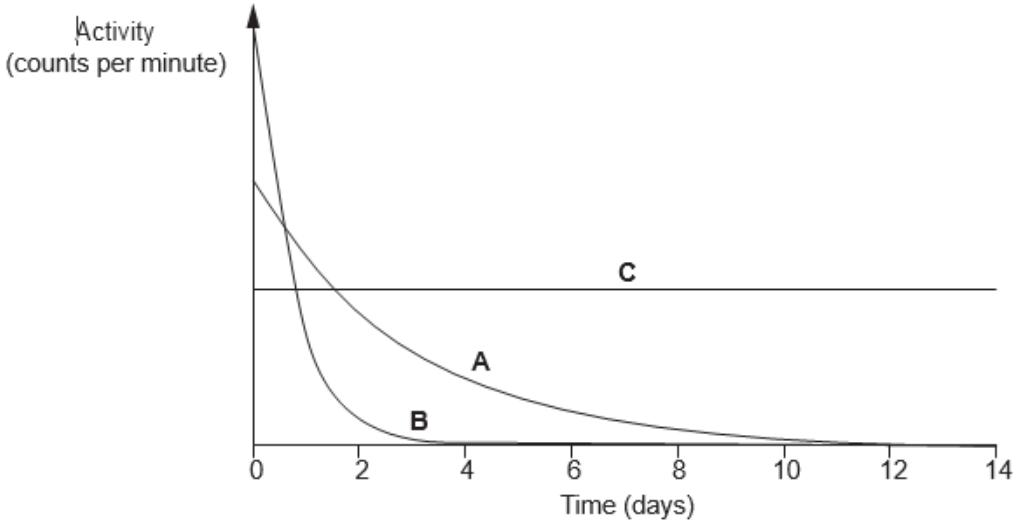
50 g of the isotope are put in a container.

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 **A** is more hazardous than **B**.<br><br>**A** has a higher activity than **B**.' | 'I think isotope **B** is more hazardous than **A**.<br><br>**B** has a longer half-life than **A**.' |

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.

**[4]**

**(c)** This is a diagram to show a nuclear fusion reaction:


**(i)** Explain why this is nuclear fusion.

**[1]**

**(ii)** It is difficult for nuclear fusion reactions to occur on Earth.

Explain why nuclear fusion reactions occur in the Sun.

**[2]**

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

**[1]**

**(d)** Some scientists say nuclear fission is renewable. Other scientists say it is non-renewable.

Suggest why the scientists disagree.

**[1]**

## Total Marks for Question Set 16: 15