

Uses and Hazards (F)

1. Which statement about nuclear **fission** is correct?

- A An example is when hydrogen is converted to helium.
- B It may happen when a nucleus absorbs a neutron.
- C The Sun uses fission to generate its energy.
- D Two nuclei join to make a heavier nucleus.

Your answer

[1]

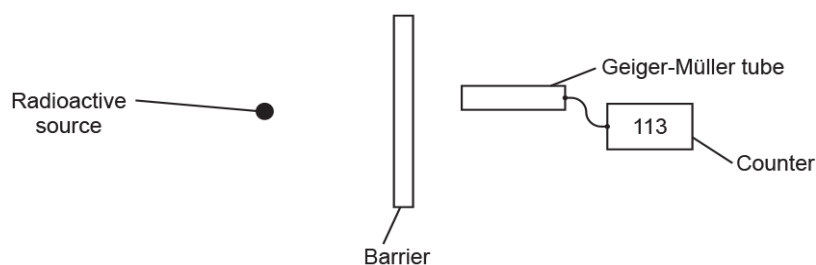
2. Some scientists say nuclear fission is renewable. Other scientists say it is non-renewable.

Suggest why the scientists disagree.

[1]

3. A teacher demonstrates an experiment about radioactivity. He demonstrates how different types of radiation can be absorbed.

He puts different barriers between the source and the Geiger-Müller tube. He uses four different radioactive sources **A, B, C** and **D**.



Suggest two safety **precautions** that the teacher should use when demonstrating this experiment.

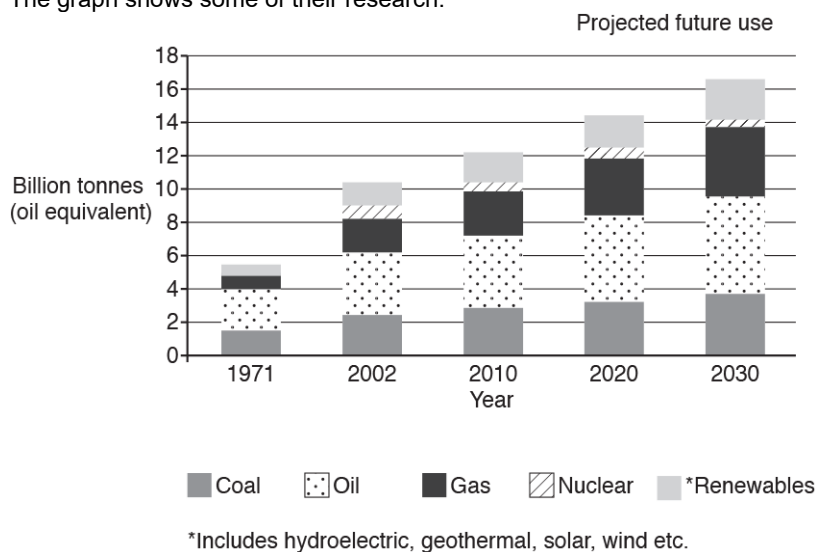
1.

2.

[2]

4. Scientists are researching the World's energy use for the future.

The graph shows some of their research.



i. The future demand for fossil fuels is expected to increase.

Give two reasons why scientists are worried about this increase in demand.

1.

2.

[2]

- ii. In the UK the government is closing coal fired power stations and planning for new nuclear power stations to be built.

Suggest why the government wants more nuclear power stations.

[2]

5 (a). 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.

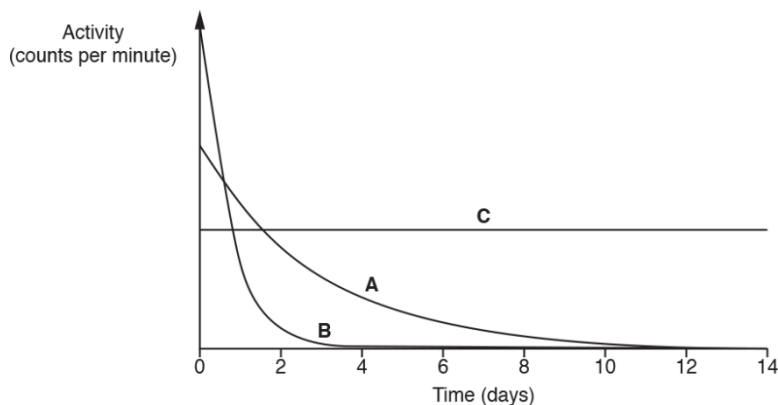
Explain why nuclear fusion reactions occur in the Sun.

[2]

iii. What will happen to our Sun when it runs out of hydrogen?

[1]

(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	<input type="checkbox"/>	B	<input type="checkbox"/>	C	<input type="checkbox"/>
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[1]

ii. Two scientists discuss the isotopes in the graph.

Scientist 1	Scientist 2
'I think isotope A is more hazardous than B . A has a higher activity than B .'	'I think isotope B is more hazardous than A . 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.

Scientist 1

Scientist 2

[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]

6. A radioactive isotope can be used as a tracer in a patient's body. It is monitored by a radiation detector outside the body.

Four possible radioactive isotopes are shown in **Table 18.2**.

Radioactive isotope	Type of radiation emitted	Half-life
Radon-222	Alpha	4 days
Iodine-131	Gamma	8 days
Cobalt-60	Gamma	5 years
Plutonium-238	Alpha	88 years

Table 18.2

- i. Doctors wear a lead apron when they use radioactive isotopes.

Explain why.

[2]

- ii. Which radioactive isotope from **Table 18.2** is best to use as a radioactive tracer in a patient's body?

Tick (✓) **one** box.

Radon-222

Iodine-131

Cobalt-60

Plutonium-238

Explain your answer.

[3]

END OF QUESTION PAPER