Combined science - Physics

Key stage 4 - Atomic Structure

Atomic Structure Review 2

Mr van Hoek

Join up the words with their definitions

Unstable	The process of radiation being released by a nucleus.
Radioactive decay	The unit of activity
Nuclear radiation	How quickly a radioactive sample decays
Activity	The ability for a nucleus to decay
Becquerel	A device to measure the count rate of a radioactive source
Geiger-Muller tube	The number of radioactive decays per second
Count rate	Unwanted hazardous materials containing radioactive atoms
Ionising power	The particles released when an unstable nucleus decays
Half life	How well it knocks off electrons and damages cells
Contamination	The time it takes half of a group of radioactive nuclei to decay

Determining half-life

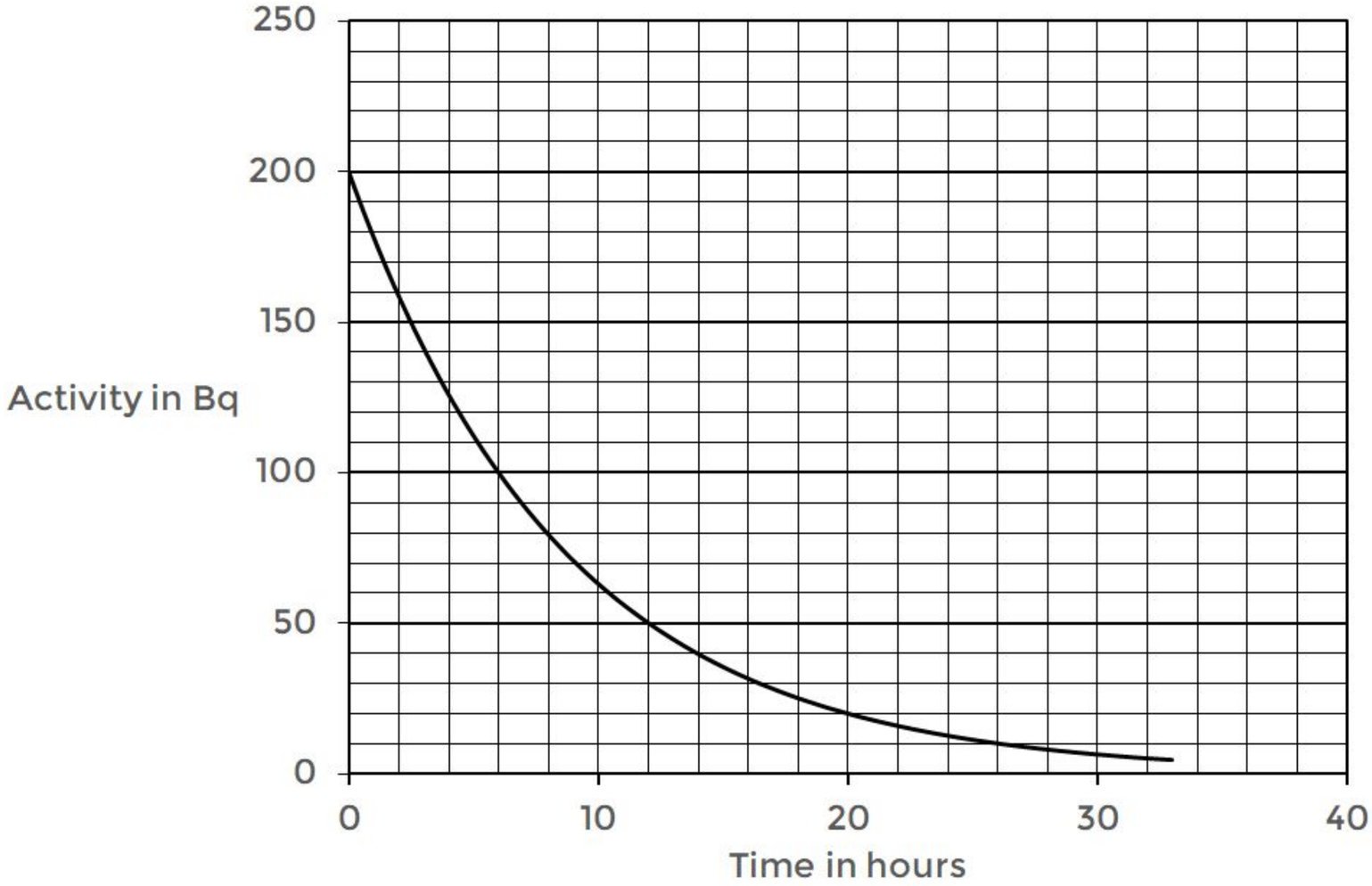


Image Credit : Edgar van Hoek

Exam Question

Some nuclei are radioactive because they are unstable.

The terms half-life and random decay are used when describing radioactivity.

Explain the concept of half-life. [2]

Why is radioactive decay described as random? [1]

OCR, Specimen, J250/12

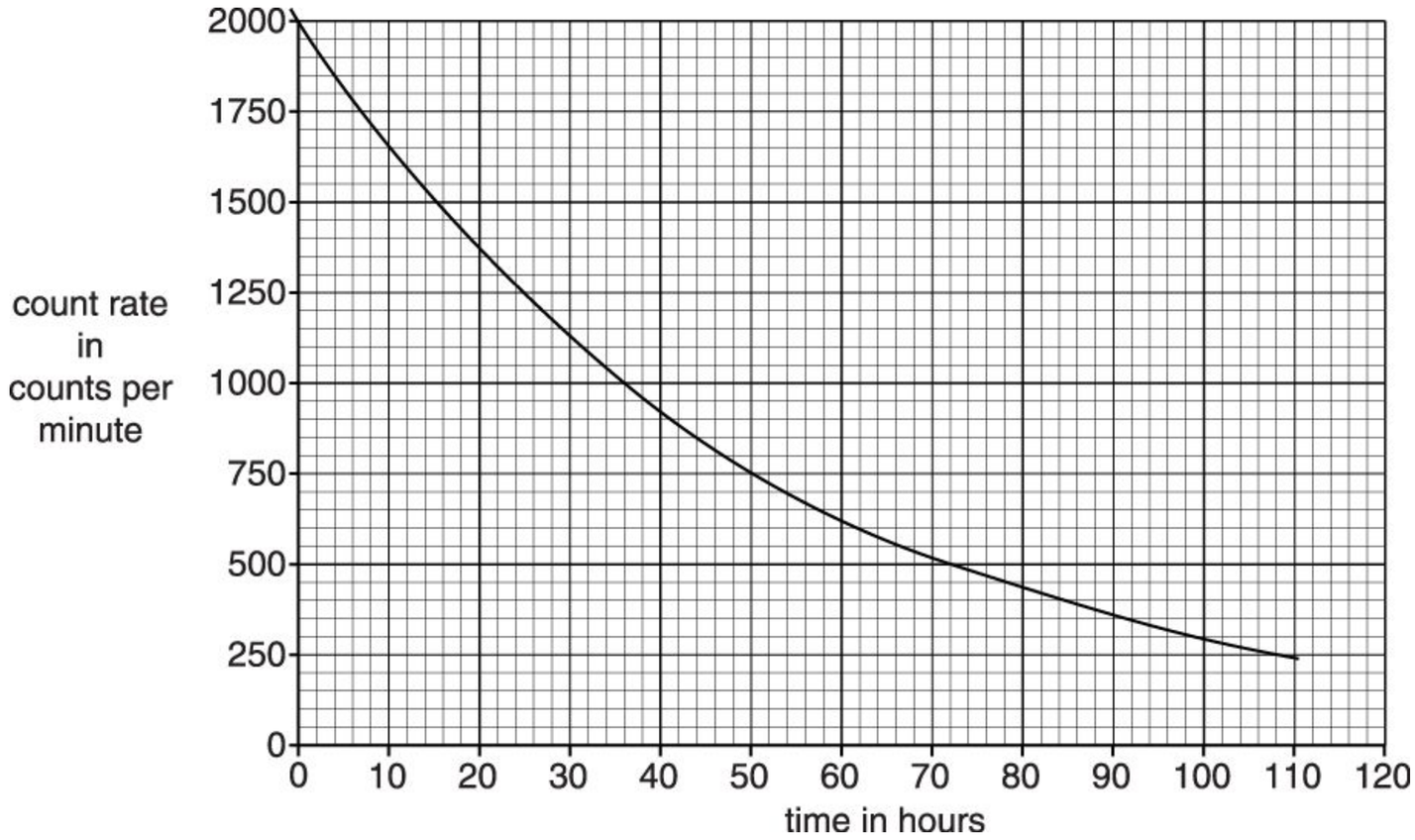
Exam Question

Vic is investigating a radioactive liquid.

He measures the count rate for a sample.

Look at the graph of his results.

Use the graph to calculate the half life of the sample.



answer _ hrs

OCR, June 2014, B722/02

Exam Question

Radioactive carbon-14 has a half-life of 5730 years.

Carbon-14 can be used to find out the age of some materials.

Explain how. [2]

Wooden beams from a house are thought to be from trees cut down about 100 years ago.

The radiocarbon dating method cannot be used to show that 100 years is the accurate value.

Suggest why. [1]

OCR, June 2016, B722/02

Exam Question

Wooden beams from a house are thought to be from trees cut down about 100 years ago.

The radiocarbon dating method cannot be used to show that 100 years is the accurate value.

Suggest why. [1]

OCR, June 2016, B722/02
Additional answers and guidance not checked by OCR

Questions on the hazards of radiation

1. What does contamination mean?

1. What does irradiation mean?

1. Suggest some suitable precautions to avoid contamination.

1. Suggest some suitable precautions to reduce irradiation.

The most suitable properties of isotopes and radiation for various uses

Use	Isotope half-life	Penetrating Power	Ionising power	Preferred radiation
Smoke Detector	Hundreds of years	Low	High	Alpha
Paper production				
Food sterilisation				
Exploring internal organs				

Exam Question

Nuclear radiation can be beneficial or harmful.

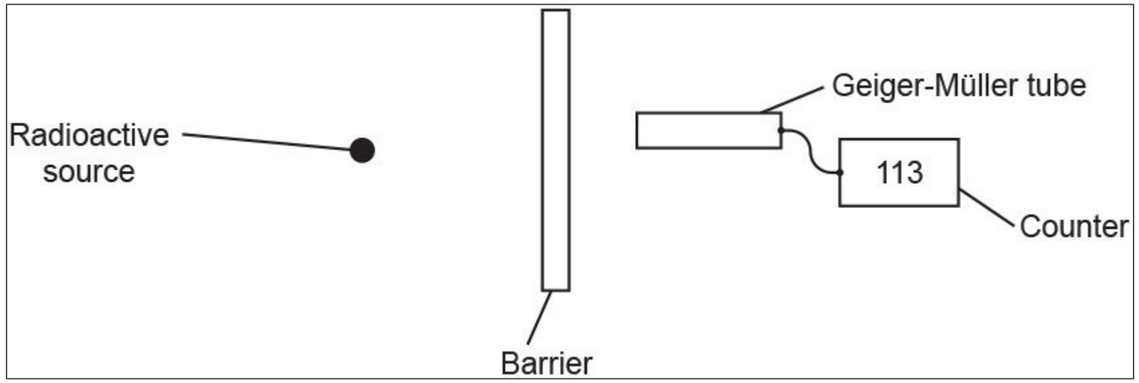
Write about one beneficial use of nuclear radiation and also how nuclear radiation can harm people. [2]

OCR, June 2015, B751/01

Exam Question

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. [2]

OCR, June 2018, J249/02

Fission and fusion answers

1. What fuels are used for nuclear fission?

1. What are the similarities and differences between fission and fusion.

1. What fuels are used for nuclear fusion?

1. What is the purpose of the control rods in nuclear fission?

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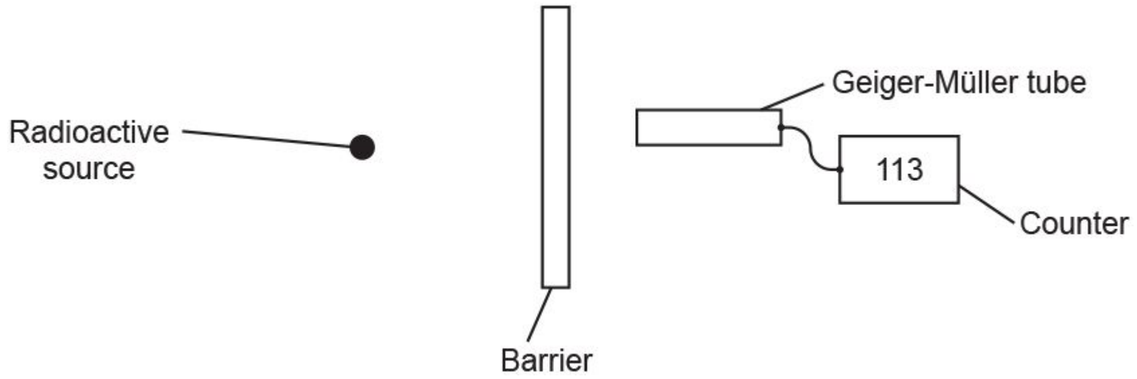

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OCR, June 2018, J249/02