Hazards of Radiation (Physics only)

Mr van Hoek

Exam Question

A teacher notices that the count rate behind a lead barrier ranges from 20 to 24.

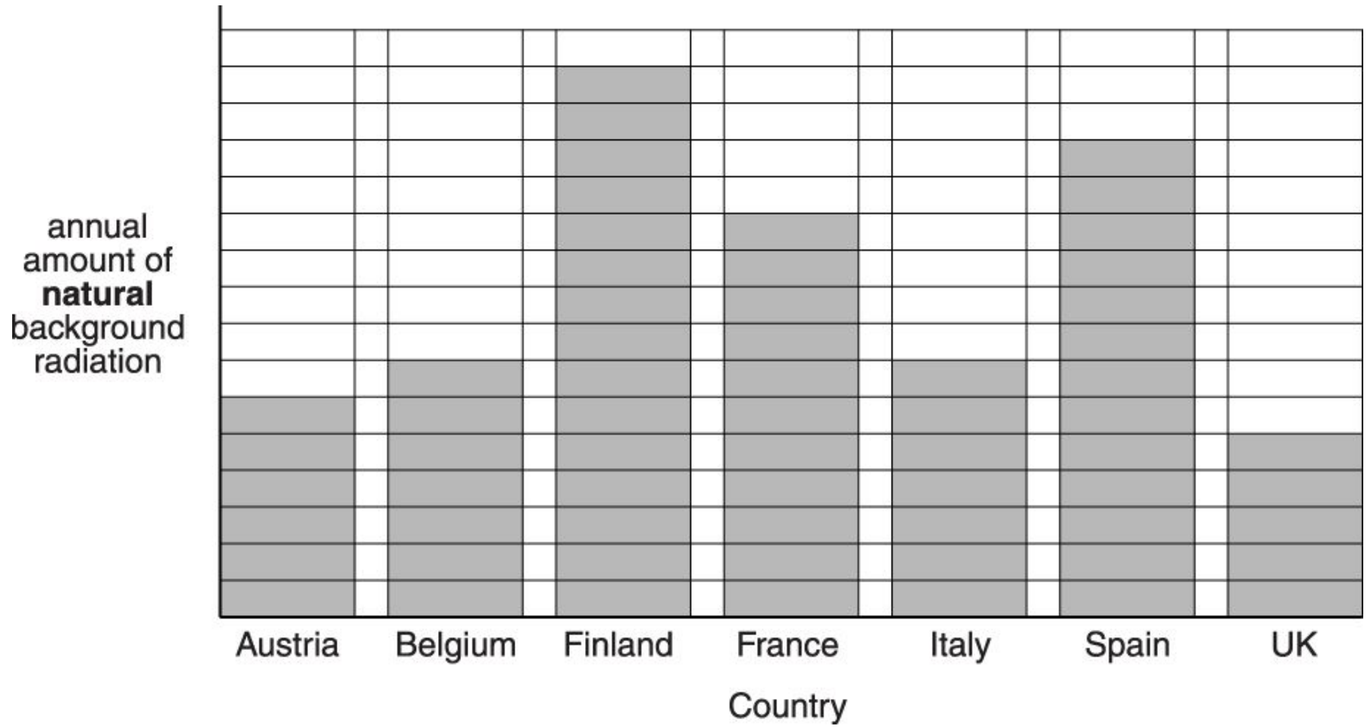
Give **two** reasons why there are a wide range of results around 22 counts per minute. [2 marks]

OCR, June 2018, J249/02

Exam Question

This question is about natural and artificial background radiation.

Ben finds information on the internet about **natural** background



i. What does the data show about the **natural** background radiation in different countries? [1]

ii.

iii. Suggest why Finland has a high annual amount of **natural** background radiation. [1]

OCR, June 2014, B752/01

Exam Question

The teacher notices that the count rate behind the lead barrier ranges from 20 to 24.

Give **two** reasons why there are a wide range of results around 22 counts per minute.

OCR, June 2018, J249/02

Contamination and Irradiation

1. What is meant by contamination?

Contamination occurs when radioactive _____ is _____ the body / object

2. What is meant by irradiation?

Irradiation occurs when object is _____ radiation from _____ of the body / object.

Is it contamination or irradiation?

Treating fruit with gamma rays to kill bacteria	Drinking tea contaminated with radioactive atoms
Using gamma rays to kill tumours	Treating dental and surgical instruments with gamma radiations
Fish living in the sea around the nuclear power station at Fukushima	Touching radioactive uranium salts
Breathing in Radon gas (an alpha emitter)	Being injected with a radioactive isotope

Precautions

In a hospital, radioactive isotopes are used for a variety of purposes.

Explain how hazards presented by contamination and irradiation from these isotopes can be reduced.

Half-life and hazard

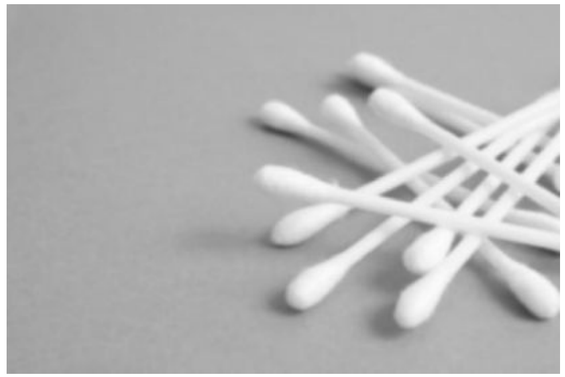
Radioactive isotopes can be used a medical tracers by injecting them into patients within solutions and then monitoring the radiation that comes from different parts of the body.

Compare the level of risk when deciding between the use of **sodium-24** and **iodine-131** for use as such a tracer.

Isotope	Half-life	Radiation emitted
Americium – 241	431 years	Alpha
Uranium-235	70 million years	Alpha
Carbon-14	5,730 years	Beta
Carbon-11	20.3 minutes	Beta
Iodine-131	8.04 days	Beta
Sodium-24	15 hours	Beta
Technetium-99m	6.02 hours	Beta
Sodium 24	14.9 hours	Gamma
Barium 137	2.6 minutes	Gamma

Exam Question - Irradiation and Contamination

These cotton wool buds have been treated with gamma rays.



The cotton wool buds have been **irradiated** but not **contaminated**.

Describe the difference between irradiated and contaminated.

[3 marks]

OCR, Specimen, J250/06

Exam Question - Precautions

Polly and Oliver were talking about the factory that is near their home.

Polly said that the factory produces dangerous radioactive waste.

Oliver said that if the waste was put into thick aluminium cans it could be stored safely.

Is Oliver correct? _

Explain your answer. [2marks]

OCR, June 2016, B712/02 Science Modules B2, C2, P2

Exam Question - Precautions

Radiographers use nuclear radiation in hospitals.

Look at the radiographer. She is preparing a patient for treatment.

Suggest **two** different ways the radiographer can remain safe when the radiation is being emitted. [2marks]

OCR, June 2016, B752/01