Oxford Cambridge and RSA

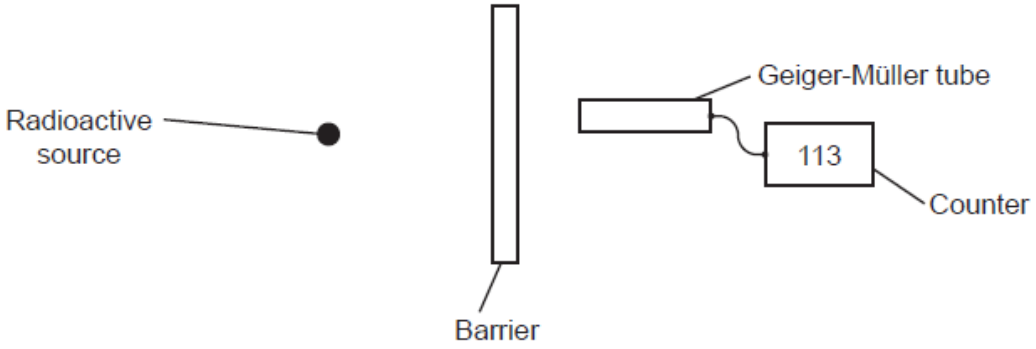
GCSE Physics A (Gateway)

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

Question Set 2

1 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**.



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

[2]

(b) The teacher chooses source **A** and uses the Geiger-Müller tube to measure the count rate (counts per minute) for different barriers. He repeats the experiment with source **B**, source **C** and then source **D**.

Look at his results.

Source	Count rate using different barriers			
	Paper	Aluminium	Lead	No barrier
A	113	112	22	112
B	20	21	20	182
C	162	23	21	164
D	282	78	24	280

He also finds that the **average count rate** with **no** sources and **no** barriers is 20.

(i) Which source **A**, **B**, **C** or **D** emits **gamma** radiation only?

Explain your answer.

[2]

(ii) Which source **A**, **B**, **C** or **D** emits **alpha** radiation only?

Explain your answer.

[2]

(iii) Which source **A**, **B**, **C** or **D** emits **beta and gamma** radiation?

Explain your answer.

[2]

(c) 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.

[2]

(d) The teacher decides to repeat the experiment.

This time he records the number of counts for a much longer time interval for each source.

Explain why this is an improvement to the experiment.

[2]

Total Marks for Question Set 2: 12