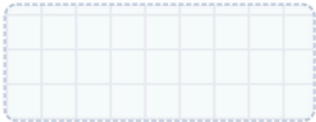
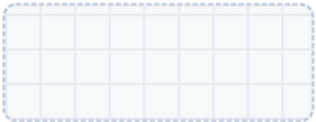
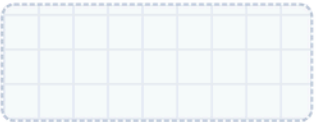
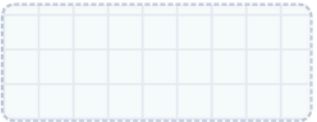


Nuclear Radiation: Structure & Properties

Complete the **structure** and **properties** of each type of nuclear radiation emitted by an _____ nucleus.

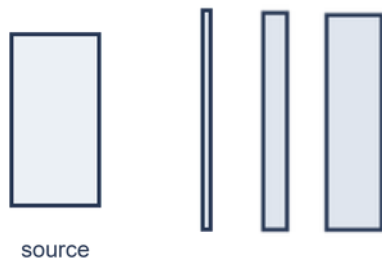
α Alpha	β Beta	γ Gamma	n Neutron
draw it 	draw it 	draw it 	draw it 
consists of _____	consists of _____	consists of _____	consists of _____
penetrates _____	penetrates _____	penetrates _____	penetrates _____
ionises _____	ionises _____	ionises _____	ionises _____
charge _____	charge _____	charge _____	charge _____

Penetration

draw the three radiations, then label everything

draw an arrow for each radiation to show how far it gets — then use every label below

☐ alpha ☐ beta ☐ gamma ☐ paper ☐ thin 3 mm aluminium ☐ 5 cm lead ☐ 3 cm air ☐ 1 metre air



Exam-style question

[5 marks]

A radioactive source emits **alpha, beta and gamma** radiation. A student places a detector a short distance from the source, then puts sheets of **paper, aluminium** and **lead** between the source and the detector in turn.

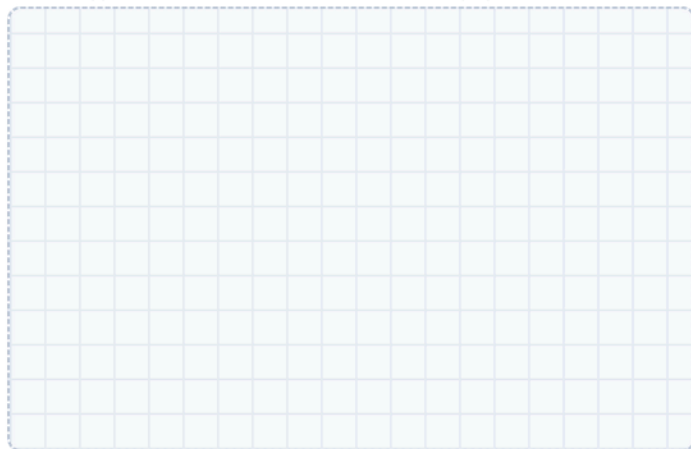
Explain how the student can use the **count rate** readings to show that the source emits **all three** types of radiation.

(5)

Identifying Radiation with a GM Tube

Measuring radiation

draw the apparatus — a source, the detector and the display



label both of these on your drawing

☐ GM tube ☐ counter

Activity is measured in _____ (Bq).

1 Bq = _____ decay per _____.

The **count rate** is the number of decays the GM tube actually _____ each second.

It is always **lower** than the activity, because the tube only catches the radiation that happens to travel **into** it.

The three tests

complete each rule

- 1 The count rate **drops** when you put **paper** in the way → _____ is present.
- 2 The count rate **drops again** when you swap the paper for **3 mm aluminium** → _____ is present.
- 3 The count rate **drops again** when behind **thick lead** → _____ is present.

Which radiation is it?

subtract the background first

Count rate with **no source** present (background radiation) = **20 counts/s**

Physics only

Source A <i>make up your own</i>			Source B <i>work it out</i>			Source C <i>work it out</i>		
absorber	count rate counts/s	corrected counts/s	absorber	count rate counts/s	corrected counts/s	absorber	count rate counts/s	corrected counts/s
none			none	500		none	320	
paper			paper	140		paper	320	
aluminium			aluminium	140		aluminium	20	
lead			lead	30		lead	20	
radiation emitted			radiation emitted			radiation emitted		
how do you know?			how do you know?			how do you know?		