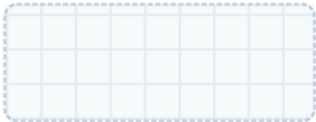
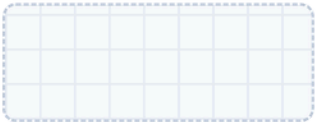
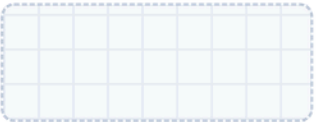
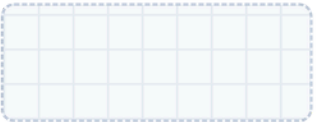


Nuclear Radiation: Structure & Properties

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

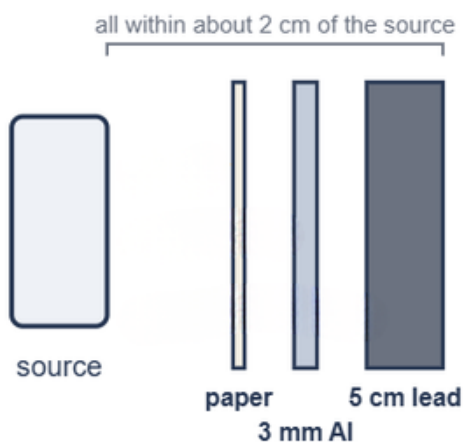
α Alpha	β Beta	γ Gamma	n Neutron
draw it 	draw it 	draw it 	draw it 
consists of _____	consists of _____	consists of _____	consists of _____
penetrates _____	penetrates _____	penetrates _____	penetrates _____
ionises _____	ionises _____	ionises _____	ionises _____
charge _____	charge _____	charge _____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

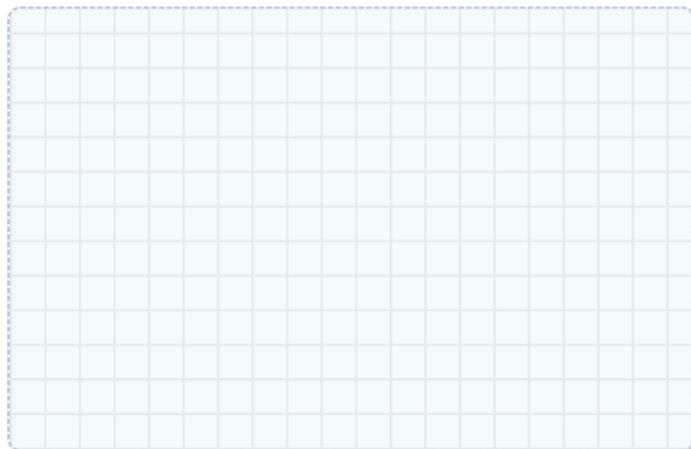
Explain how the student can use the **count rate** readings to show that the source emits **all three** types of radiation.

(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 **ground** behind **thick lead** → _____ is present.

Which radiation is it?

subtract the background first

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

Source A

make up your own

absorber	count rate counts/s	corrected counts/s
none		
paper		
aluminium		
lead		

radiation emitted

how do you know?

Source B

work it out

absorber	count rate counts/s	corrected counts/s
none	500	
paper	140	
aluminium	140	
lead	30	

radiation emitted

how do you know?

Source C

work it out

absorber	count rate counts/s	corrected counts/s
none	320	
paper	320	
aluminium	20	
lead	20	

radiation emitted

how do you know?