Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic : 6_ Radioactivity

Name of the Student:_____
Max. Marks : 25 Marks **Time : 25 Minutes**

Q1.

Answer the question with a cross in the box you think is correct ☒ . If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒ .

An atom has a central nucleus containing neutrons and protons.

Electrons orbit the nucleus.

(i) Which row of the table gives the relative mass and charge of a proton?

(1)

		relative mass	charge
☐	**A**	0	+1
☐	**B**	0	−1
☐	**C**	1	+1
☐	**D**	1	−1

(ii) An atom has a radius of 1.0×10^{-10} m.

A nucleus has a radius of 1.0×10^{-15} m.
Calculate the ratio of the radius of the atom to the radius of the nucleus.

(2)

ratio of radius of atom to radius of nucleus = ...

(iii) Explain why an atom has no charge overall.

(2)

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(Total for question = 5 marks)

Q2.

In 1908 a scientist called Rutherford was investigating ideas about atoms.

His students fired a beam of alpha particles at a thin piece of gold foil.

Figure 5 shows the arrangement of the experiment.

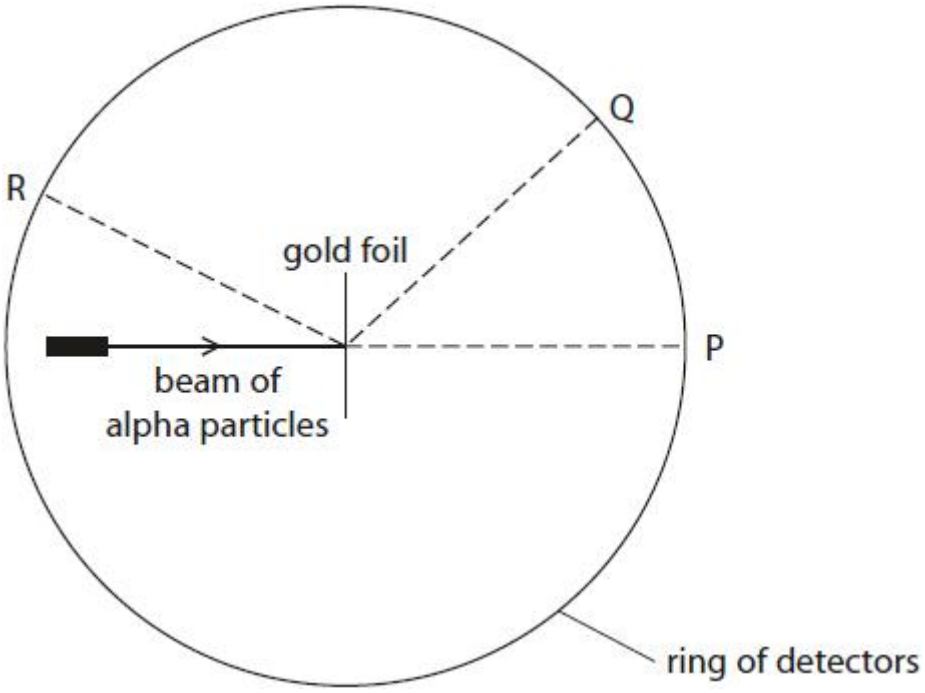

Figure 5

Some alpha particles were found at all parts of the ring of detectors.

The table in Figure 6 shows how many alpha particles were detected at P, at Q and at R, in one experiment.

position	number of alpha particles detected
P	72340
Q	25
R	2

Figure 6

Explain what the information in Figure 5 and Figure 6 shows about the structure of an atom.

(6)

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(Total for question = 6 marks)

Q3.

Figure 10 shows a Geiger–Muller (G–M) tube attached to a counter.
The G–M tube is used to measure the activity of a source of beta (β) radiation.
There is an aluminium sheet between the beta source and the G–M tube.
The counter is switched on and after 1 minute shows a count of 268.

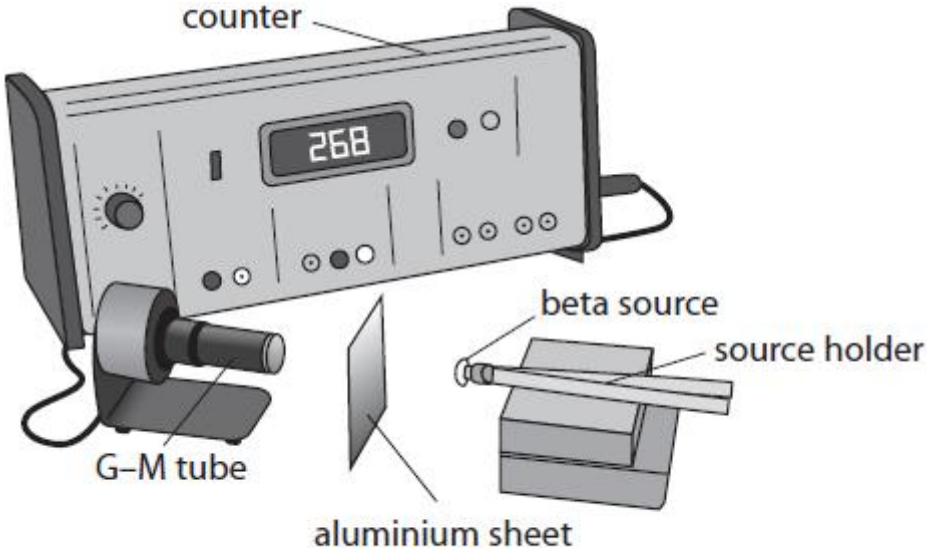

Figure 10

(i) The aluminium sheet is taken away.
The counter is reset to zero and then switched on again.
A new count is taken for 1 minute.

Explain why the new count is greater than 268.

(2)

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(ii) The beta source is then also taken away.
The counter is reset to zero and switched on again.

A new count is taken for 1 minute.

Give a reason why there would now be a reading on the counter.

(1)

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(iii) State the SI unit for the activity of a radioactive source.

(1)

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(Total for question = 4 marks)

Q4.

Ionising radiations are emitted by unstable nuclei.

(a) (i) Which particle has the same mass as but opposite charge to a β^+ particle?

Put a cross (■) in the box next to your answer.

(1)

☒ **A** electron

☒ **B** positron

☒ **C** proton

☒ **D** neutron

(ii) Suggest why a beta particle will travel further in air than an alpha particle.

(2)

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(b) Complete the sentence by putting a cross (■) in the box next to your answer.

Following the radioactive decay of a nucleus, the nucleus might undergo some rearrangement, losing energy as

(1)

☒ **A** gamma radiation

☒ **B** a proton

☒ **C** a neutron

☒ **D** an X-ray

(c) Some unstable nuclei decay by emitting β^- radiation.

(i) Describe the process of β^- emission.

(3)

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(ii) Explain what happens to the mass number and the atomic number of a nucleus when β^- emission occurs.

(3)

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(Total for Question = 10 marks)