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

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Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

The teacher now investigates the absorption of beta radiation by different thicknesses of aluminium.

The apparatus available is

- a source of beta radiation
- a Geiger-Müller (G-M) tube and counter
- 10 pieces of aluminium, each 0.5 mm thick
- a metre rule.

(i) Sketch a labelled diagram showing the positions of the apparatus when the measurements are being taken.

(2)

(ii) Give the independent variable in this investigation.

(1)

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(iii) Name a quantity that must be kept constant during the investigation.

(1)

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(iv) Strontium-90 is the source of beta minus radiation in this investigation.

Complete the nuclear equation for this emission of beta minus radiation.

(2)

$$^{90}_{38}Sr \longrightarrow {}^{0}\beta + \square + {}^{90}Y\ \square$$

(Total for question = 6 marks)

Q2.

Carbon-13 and carbon-14 are isotopes of carbon.

Nuclei of carbon-13 and carbon-14 can be represented by these symbols

$$^{13}_{6}C \quad \text{and} \quad ^{14}_{6}C$$

Complete the table for an atom of carbon–13 and an atom of carbon–14.

(2)

	number of neutrons in the nucleus	number of electrons in orbit around the nucleus
carbon-13		
carbon-14		

(Total for question = 2 marks)

Q3.

Students are given the apparatus shown in Figure 12 and a protractor.

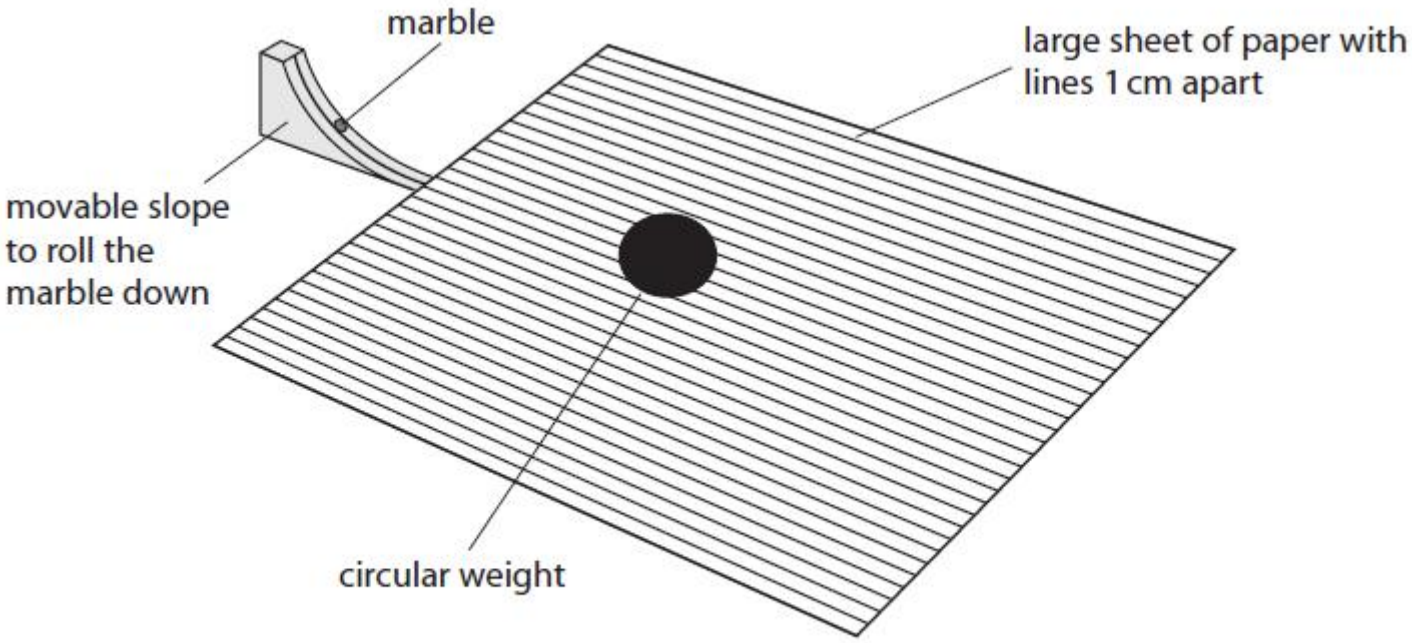

Figure 12

(i) Describe how the students could use the apparatus to model the scattering of alpha particles.

(2)

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(ii) Give **one** limitation of this model.

(1)

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(Total for question = 3 marks)

Q4.

Describe how the energy released in the chain reaction in a nuclear reactor is used to drive a turbine in a nuclear power station.

(3)

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(Total for question = 3 marks)

Q5.

Describe how the thermal energy from nuclear fission can be used to turn the electrical generator in a power station.

(2)

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(Total for question = 2 marks)

Q6.

Stars may originate as a nebula.

(i) Describe the process that then occurs to produce the conditions necessary for nuclear fusion in a new star.

(3)

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(ii) The energy, E, released in nuclear fusion is equivalent to loss in mass, m, according to the equation.

$$E = mc^2$$

where c is the velocity of light.
$c = 3.00 \times 10^8$ m/s
In 1 second, the energy radiated by the Sun is 3.86×10^{26} J.
Calculate the loss in mass of the Sun in 1 second.

(2)

loss in mass = ... kg

(Total for question = 5 marks)