Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: GCSE Triple Science Atomic Structure (Low Demand Questions)

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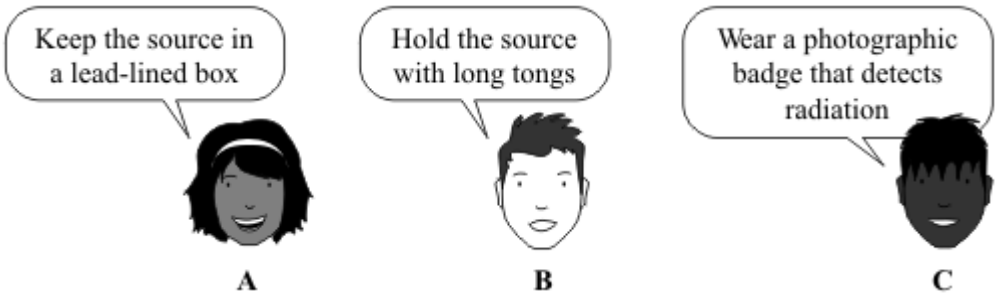
Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Q1.

Before using a radioactive source, a teacher asked her students to suggest safety procedures that would reduce her exposure to the radiation. The students made the following

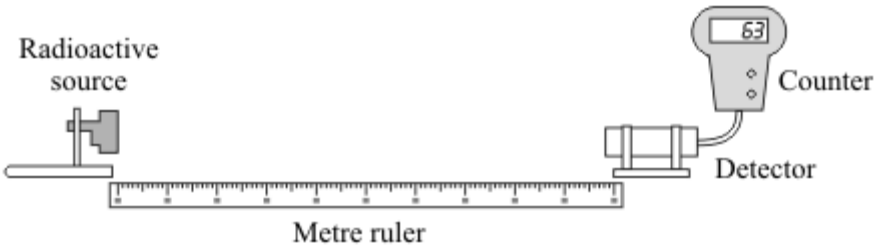


(a) Which suggestion, **A**, **B** or **C**, would **not** reduce the exposure of the teacher to radiation?

_____

(1)

(b) The diagram shows how the teacher measured the distance that the radiation traveled from the source. The count-rate at different distances from the source was measured and recorded in the table.



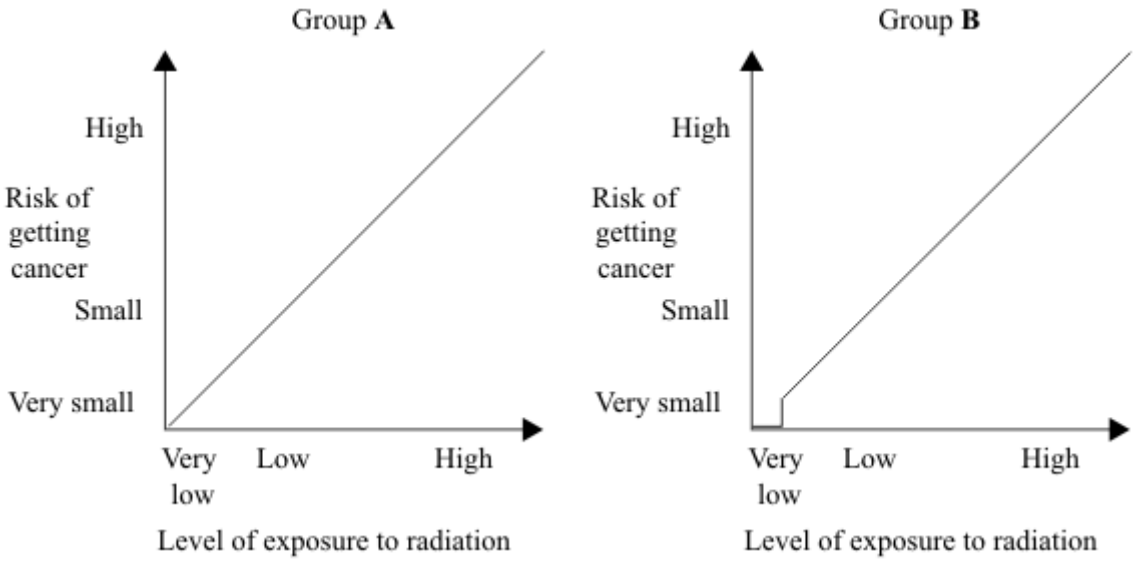
Distance from source to detector in cm	Count-rate in counts per minute
20	85
40	81
60	58
80	53
100	23

What type of radiation was the source emitting, alpha, beta or gamma?

Explain the reasons for your choice.

(3)

(c) The graphs show how two groups of scientists, **A** and **B**, link exposure to radiation and the risk of getting cancer.



(i) Complete the following sentence using a word or phrase from the box.

decreases	**has no effect on**	**increases**

Both groups of scientists agree that a high level of exposure to radiation

_____ the risk of getting cancer.

(1)

(ii) Use the graphs to describe carefully how the two groups of scientists disagree when the level of exposure to radiation is very low.

(2)

(Total 7 marks)

Q2.

Four different processes are described in **List A**. The names of these processes are given in **List B**.

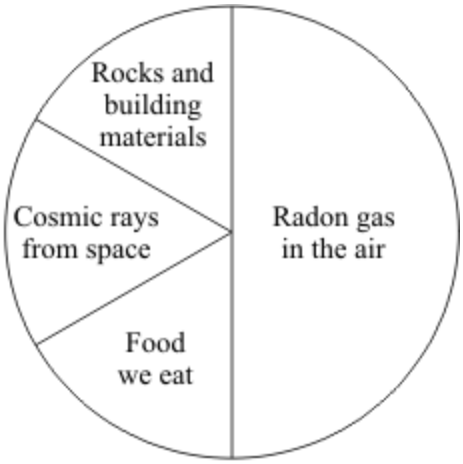
Draw a line to link each description in **List A** to its correct name in **List B**.
Draw only **four** lines.

List A	List B
the nuclei of two atoms joining together	gamma emission
the nucleus of an atom splitting into several pieces	electric current
an atom losing an electron	ionisation
an electric charge moving through a metal	nuclear fission
	nuclear fusion

(Total 4 marks)

Q3.

(a) The pie chart shows the average proportions of natural background radiation from various sources in one part of the UK.



(i) What proportion of the background radiation comes from radon gas?

_____

(1)

(ii) Suggest why our bodies are slightly radioactive.

_____

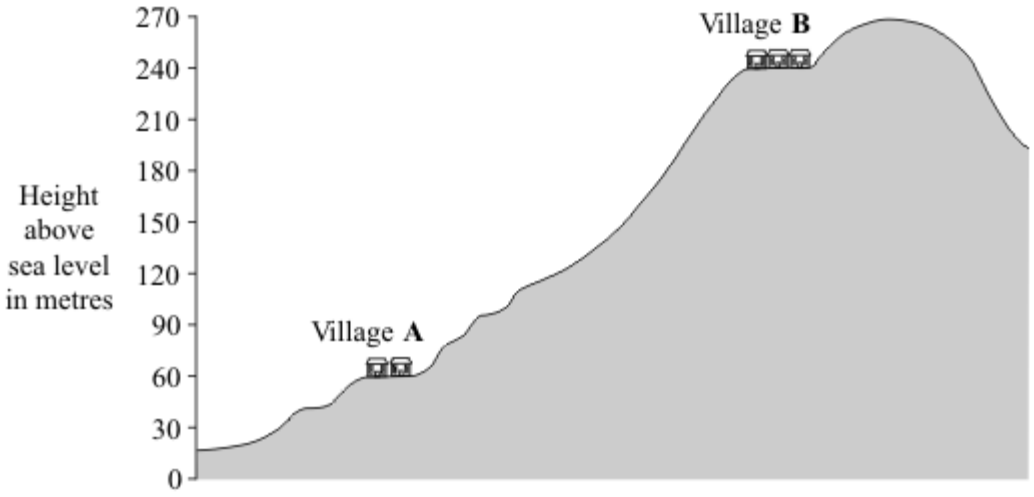
_____

(1)

(b) The level of background radiation from cosmic rays is not the same everywhere. For every 30

metres above sea level, the amount of background radiation increases by one unit.

The diagram shows the position of two villages, **A** and **B**, built on a hill.



How is the amount of background radiation from cosmic rays different in village **A** compared to village **B**?

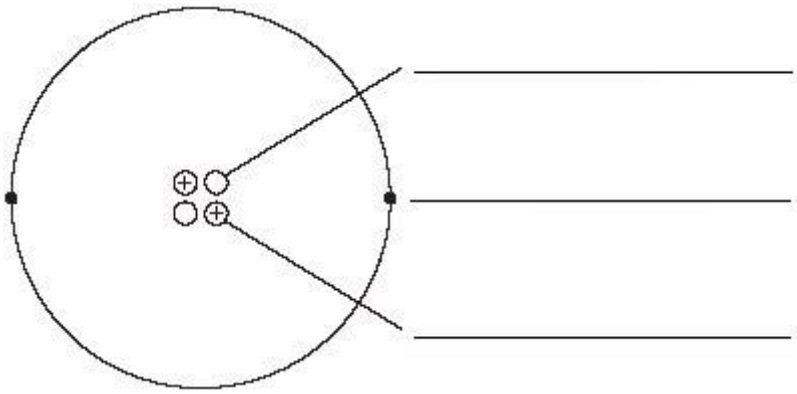
To obtain full marks you must include a calculation in your answer.

(3)

(Total 5 marks)

Q4.

The diagram shows a helium atom.



(a) (i) Use the words in the box to label the diagram.

electron	**neutron**	**proton**

(2)

(ii) An alpha particle is the same as the nucleus of a helium atom.

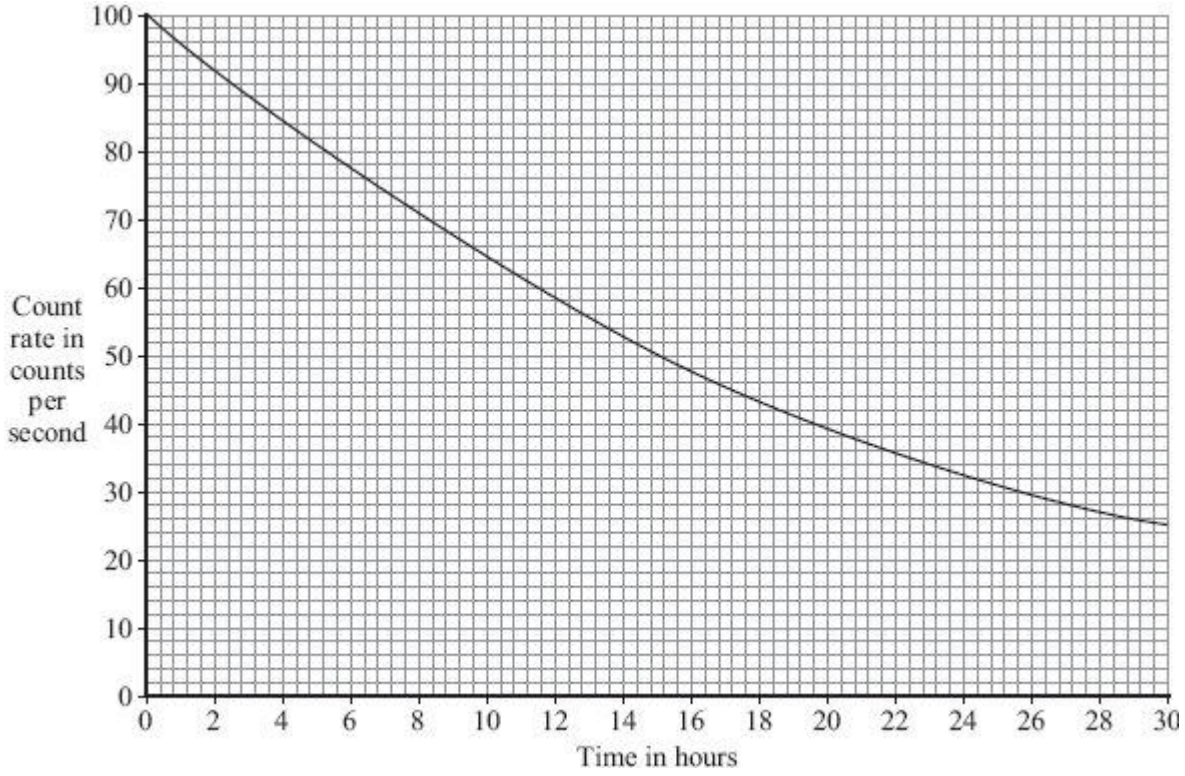
How is an alpha particle different from a helium atom?

_____

_____

(1)

(b) The graph shows how the count rate from a sample of radioactive sodium-24 changes with time.



(i) How many hours does it take for the count rate to fall from 100 counts per second to 50 counts per second?

Time = _____ hours

(1)

(ii) What is the half-life of sodium-24?

Half-life = _____ hours

(1)

(c) A smoke detector contains a small amount of americium-241.

Americium-241 is a radioactive substance which emits alpha particles. It has a half-life of 432 years.

(i) Which **one** of the following statements gives a reason why the americium-241 inside the smoke detector will **not** need replacing?

Put a tick (✓) in the box next to your answer.

The alpha particles have a low energy. ☐

People replace smoke detectors every few years. ☐

Americium-241 has a long half-life. ☐

(1)

(ii) The diagram shows the label on the back of the smoke detector.

Why do people need to know that the smoke detector contains a radioactive material?

_____

_____

(1)

(Total 7 marks)