Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Atomic Structure (Standard Demand)

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Name of the Student:_____

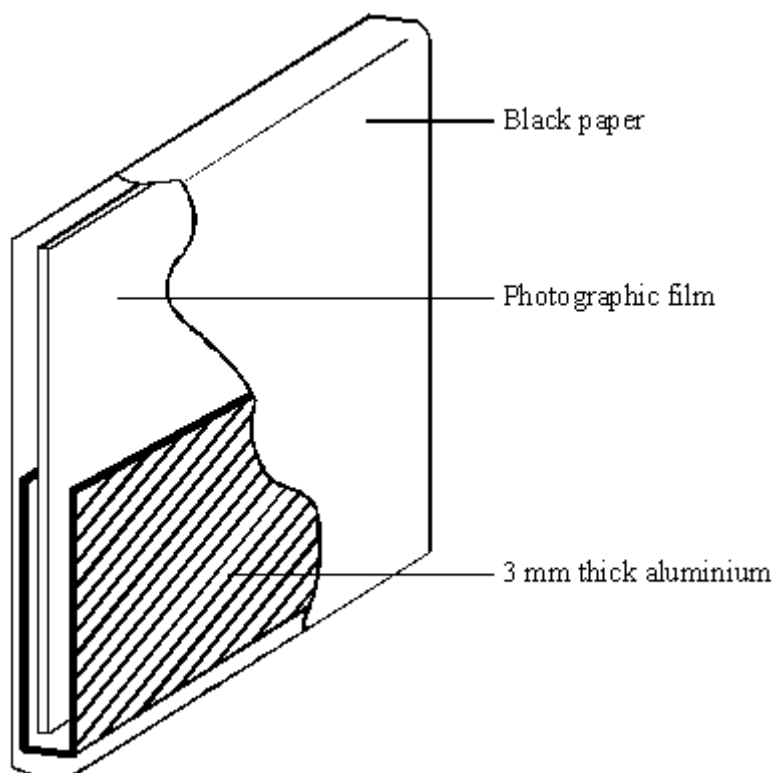**Max**. **Marks : 21 Marks**   **Time : 21 Minutes**

Q1.

The diagram shows a badge worn by a worker at a nuclear power station.

Part of the outer black paper has been removed so that you can see the inside of the badge.

— Black paper

— Photographic film

— 3 mm thick aluminium

Scientists examined the worker's badge at the end of a day's work.
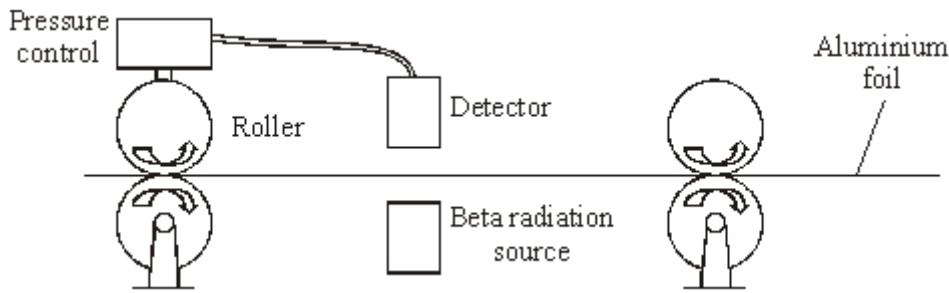
They found that the top part of the badge had been affected by radiation, but the bottom half had not.

What type of radiation had the worker been exposed to? Explain the reasons for your answer.

_____

_____

_____

_____

                                                                                            (Total 2 marks)

Q2.

The diagram shows how the thickness of aluminium foil is controlled. The thicker the aluminium foil, the more radiation it absorbs.

(a)   The designers used a beta radiation source for this control system.

   (i)   Why would an alpha radiation source be unsuitable in this control system?

   _____

   _____

   (1)

   (ii)   Why would a gamma radiation source be unsuitable in this control system?

   _____

   _____

   (1)

(b)   The substance used in the beta radiation source is radioactive.

   (i)   Why are some atoms radioactive?

   _____

   _____

   (1)

   (ii)   Explain why radiation is dangerous to humans.

   _____

   _____

   _____

   _____

   (2)
   (Total 5 marks)

Q3.

(a)   Complete the sentences about atoms.

In an atom, the number of electrons is equal to the number of _____ .

All atoms of an element have the same number of _____ .

Isotopes of the same element have different numbers of _____ .

(b)   Complete the sentence.

When an atom of a radioactive element emits alpha radiation, an atom of a different

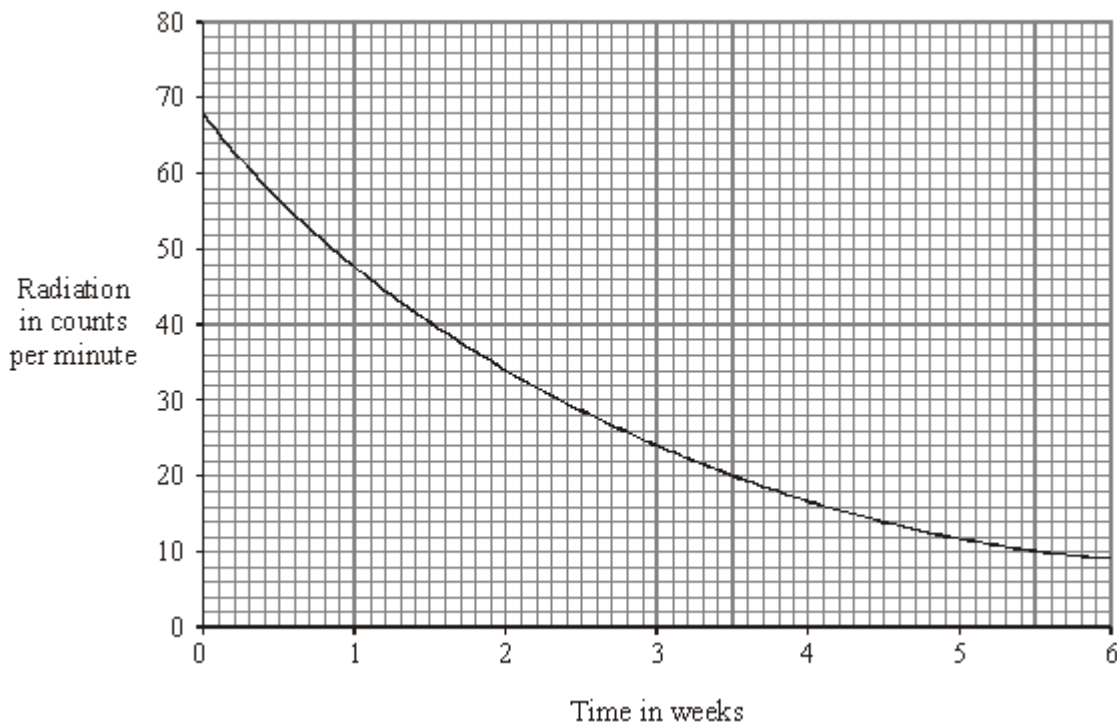element is formed. A different element is formed because the radioactive element

has lost _____ .

(1)
(Total 4 marks)

Q4.

A teacher measured the amount of radiation from a radioactive source, during the same lesson each week, over a period of six weeks.

The results are shown on the graph.

How long does it take for the radiation to fall from 68 counts per minute to half that value?

Show clearly how you work out your answer.

_____

_____

_____

Time taken for radiation to halve _____

(Total 3 marks)

Q5.

People who work in places where radiation is present, for example in X-ray departments in hospitals, have to wear a "film badge". These badges are sent away regularly to check on the amount of radiation to which the person has been exposed. Simply described, the badge is some photographic

film in a suitable holder.

(a)   (i)   Why is the "film badge" of little use in detecting alpha particles?

    _____

    (1)

    (ii)   How does the "film badge" show radiation has reached it?

    _____

    (1)

(b)   Radioactivity can cause harm. It also has a number of valuable uses.

    (i)   How can radioactivity harm our bodies?

    _____

    _____

    (1)

    (ii)   Give **two** medical uses of radioactive isotopes.

    1. _____

    2. _____

    (2)

(c)   A radioactive isotope of lead has a half-life of 10.6 hours.

    A small sample of lead containing this isotope has a count rate of 8000 counts per minute.

    How long will it be before the count rate is 1000 counts per minute?

    _____

    _____

    Time = _____ hours

    (2)
    (Total 7 marks)