

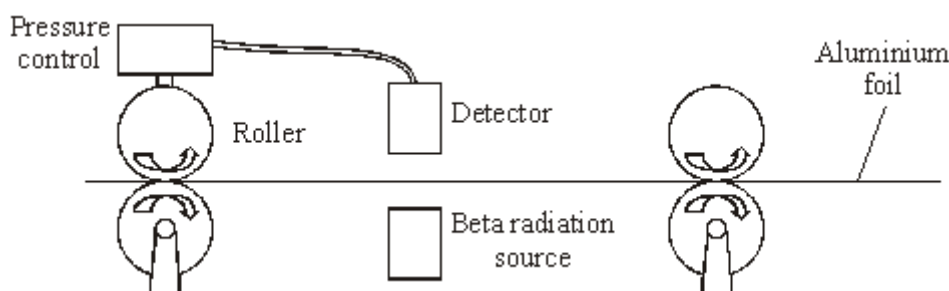
Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

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.

Q2.

- (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 _____.

(3)

- (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 _____.

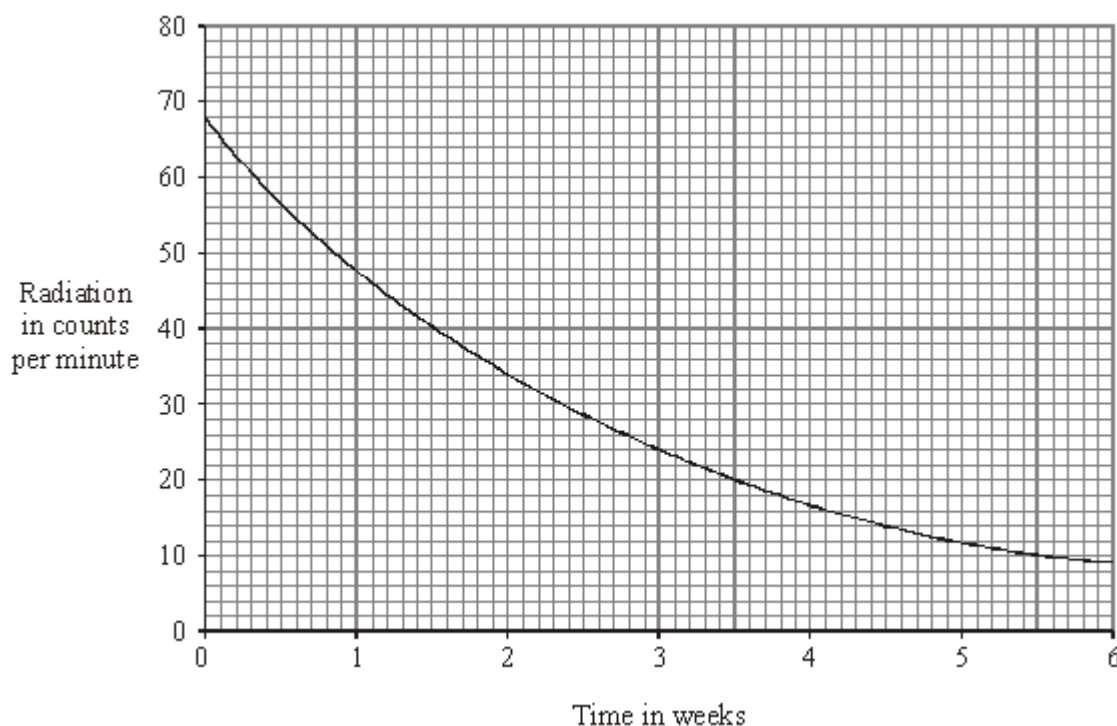
(1)

(Total 4 marks)

Q3.

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)

Q4.

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)