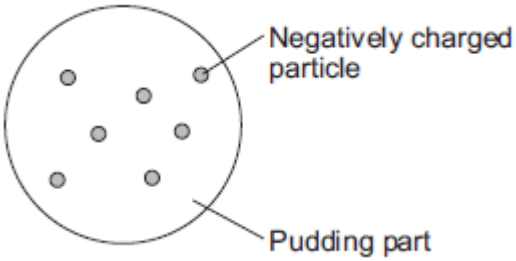
Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: GCSE Triple Science Atomic Structure (Standard Demand Questions)

Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

(a) Over 100 years ago, scientists thought the atom was like a 'plum pudding'. The diagram below shows the plum pudding model of the atom.



The scientists knew that an atom has negatively charged particles. They also knew that an atom has no overall charge.

What did the scientists conclude about the **charge** on the 'pudding part' of the atom?

_____

_____

(1)

(b) Two scientists named Rutherford and Marsden devised an experiment to investigate the plum pudding model of the atom. The experiment involved firing alpha particles at a thin sheet of gold. The scientists measured how many of the alpha particles were scattered.

Using the plum pudding model, the scientists predicted that only a few of the alpha particles would be scattered by more than 4°.

Over several months, more than 100 000 measurements were made.

(i) The results from this experiment caused the plum pudding model to be replaced by a new model of the atom.

Explain why.

_____

_____

_____

_____

_____

_____

(2)

(ii) Suggest **one** reason why other scientists thought this experiment provided valid evidence for a new model of the atom.

_____

_____

_____

(1)

(c) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Describe the model now used for the structure of an atom.

In your answer you should:
- give details of the individual particles that make up an atom
- include the relative masses and relative charges of these particles.

Do **not** include a diagram in your answer.

_____

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(6)

(Total 10 marks)

Q2.

Different radioactive isotopes have different values of half-life.

(a) What is meant by the 'half-life' of a radioactive isotope?

_____

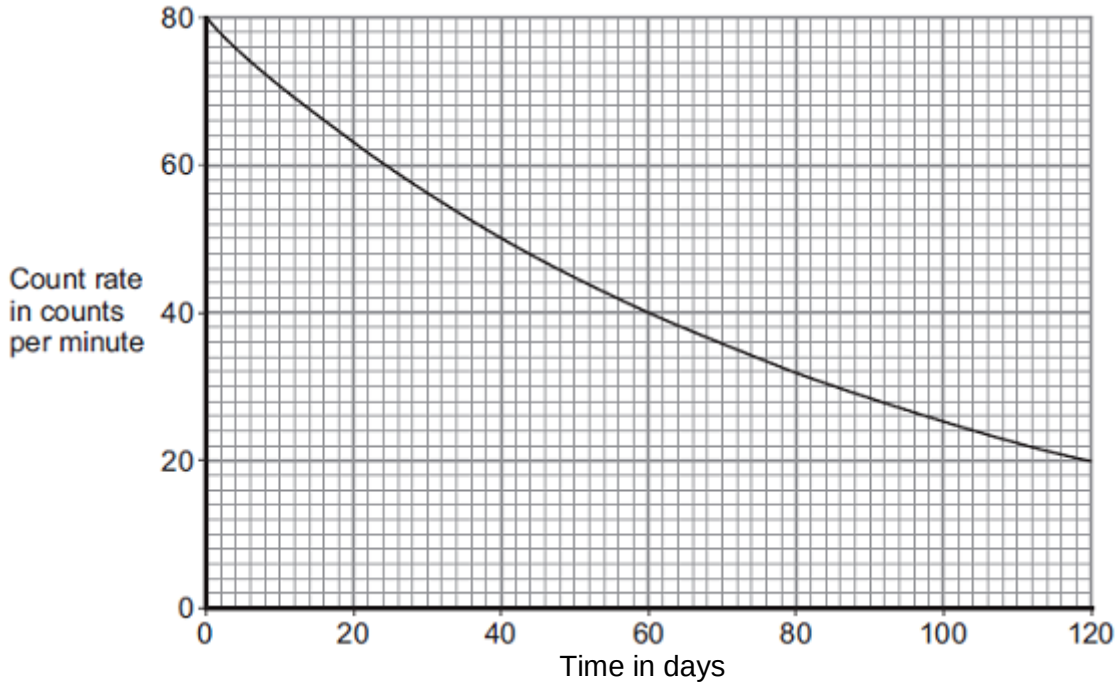
_____

_____

(1)

(b) **Figure 1** shows how the count rate from a sample of a radioactive isotope varies with time.

Figure 1



Use information from **Figure 1** to calculate the half-life of the radioactive isotope.

Show clearly on **Figure 1** how you obtain your answer.

Half-life = _____ days

(2)

(c) The table below shows data for some radioactive isotopes that are used in schools.

Radioactive isotope	**Type of radiation emitted**	**Half-life in years**
Americium-241	Alpha and gamma	460
Cobalt-60	Gamma	5
Radium-226	Alpha, beta and gamma	1600
Strontium-90	Beta	28
Thorium-232	Alpha and beta	1.4×10^{10}

(i) State which radioactive isotope in the table above emits only radiation that is **not** deflected by a magnetic field.

Give a reason for your choice.

_____

_____

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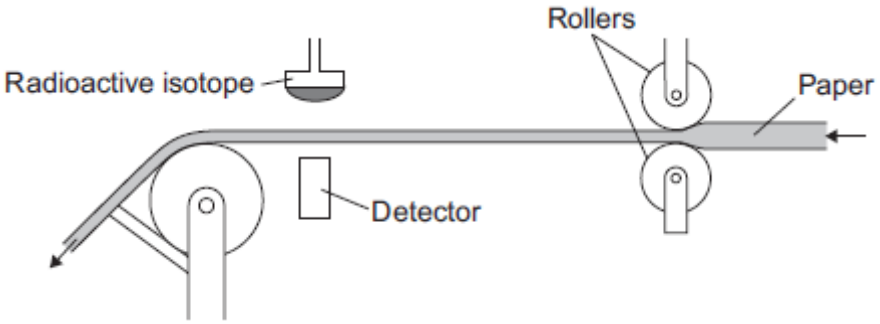
(2)

(ii) **Figure 2** shows a radioactive isotope being used to monitor the thickness of paper during production.

Figure 2



State which radioactive isotope in the table should be used to monitor the thickness of the paper.

Explain your choice.

_____

_____

_____

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_____

(3)

All the radioactive isotopes in the table have practical uses.

State which source in the table would need replacing most often.

Explain your choice.

_____

_____

_____

_____

_____

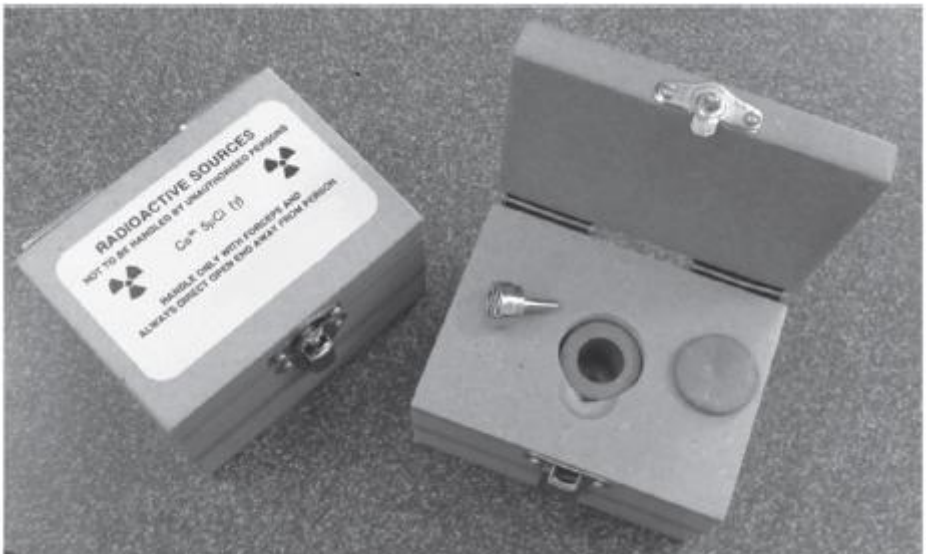
(3)

(iii) When the radioactive isotopes are not in use, they are stored in lead-lined wooden boxes.

The boxes reduce the level of radiation that reaches the surroundings.

Figure 3 shows two of these boxes.

Figure 3



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State **one** source from the table which emits radiation that could penetrate the box.

Explain your answer.

_____

_____

_____

_____

_____

_____

(3)

(Total 14 marks)