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

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

The radioactive isotope, carbon-14, decays by beta (β) particle emission.

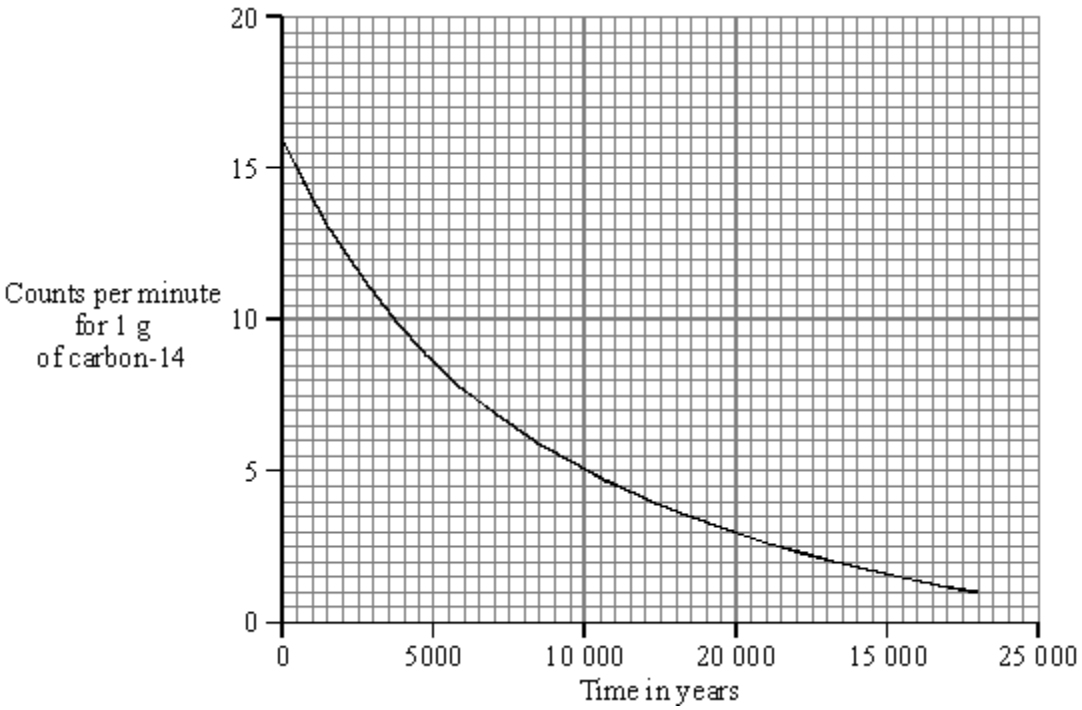
(a) What is a beta (β) particle?

_____

_____

(1)

(b) Plants absorb carbon-14 from the atmosphere. The graph shows the decay curve for 1 g of carbon-l4 taken from a flax plant.



Use the graph to find the half-life of carbon-l4. You should show clearly on your graph how you obtain your answer.

Half-life = _____ years.

(2)

(c) Linen is a cloth made from the flax plant. A recent exhibition included part of a linen shirt, believed to have belonged to St. Thomas à Becket, who died in 1162. Extracting carbon-14 from the cloth would allow the age of the shirt to be verified.

If 1 g of carbon-14 extracted from the cloth were to give 870 counts in 1 hour, would it be

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possible for the shirt to have once belonged to St. Thomas à Becket? You must show clearly the steps used and reason for your decision.

_____

_____

_____

_____

(3)

(Total 6 marks)

Q2.

Radon is a radioactive gas. Radon makes a major contribution to background radiation levels. Radon atoms decay by the emission of *alpha particles*.

(a) (i) What is an *alpha particle*?

_____

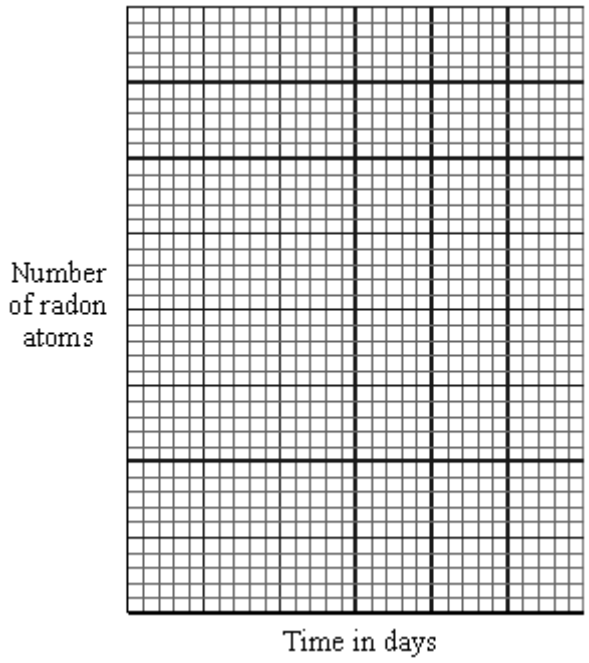
(1)

(ii) From which part of the radon atom does the alpha particle come?

_____

(1)

(b) (i) A sample of air contains 40 000 radon atoms. The half-life of radon is four days. Draw a graph to show how the number of radon atoms present in a sample of air will change over a period of 12 days.



(3)

(ii) After 20 days, how many of the radon atoms from the original sample of air will have decayed? Show clearly how you work out your answer.

_____

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_____

_____

Number of radon atoms decayed = _____

(3)

(c) Fairly constant concentrations of radon gas have been found in some deep mine shafts.

(i) Suggest why the concentration of radon gas remains fairly constant although the radon gas decays.

_____

_____

(1)

(ii) Explain why the long term exposure to large concentrations of radon gas could be a danger to health.

_____

_____

_____

_____

(2)

(Total 11 marks)

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