

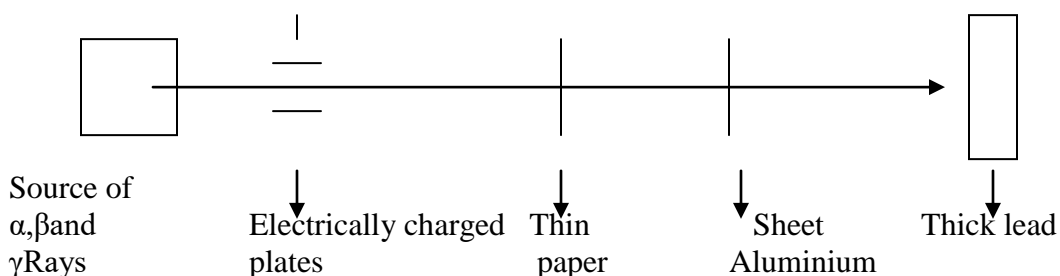
NAME \_\_\_\_\_ INDEX NUMBER \_\_\_\_\_

SCHOOL \_\_\_\_\_ DATE \_\_\_\_\_

## RADIOACTIVITY

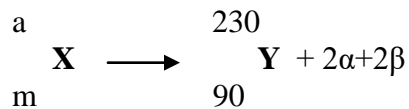
1. **1989 Q 16**

Complete the diagram below to show how the particles and rays are reflected and at which material each of them is stopped. (2 marks)



2. **1990 P1A Q 2**

What are the values of  $m$  and  $a$  in the nuclear equation given below? (2 Marks)



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3. **1991 P1A Q13**

Write mass number and atomic number of the isotope formed when it undergoes radioactive decay by emitting a particle.

Mass number: (1 mark)

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Atomic number (1 mark)

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4. **1992 P1A Q17**

Radioactive, polonium, 216, decays as shown below:-



Determine the values of M and N.

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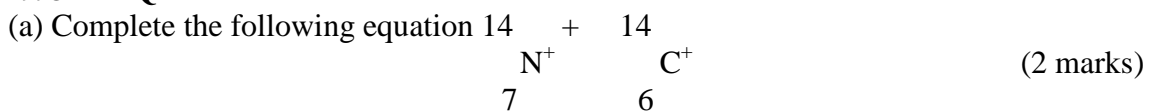
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5. **1993 P1A Q 14**



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(b) Give one use of radioactive elements (1 mark)

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6. **1993 Q P1A 7**

The Table below gives the rate of decay for radioactive element Y.

Number of days	Mass (g)
0	384
270	48

Calculate the half-life of the radioactive element Y.

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7. **1995 P1A Q30**

(a) 100g of radioactive  ${}_{91}^{233}\text{Pa}$  was reduced to 12.5g after 81 days.

${}_{91}^{233}\text{Pa}$

91

Determine the half-life of Pa.

(2 marks).

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b)  ${}_{91}^{233}\text{Pa}$  decays by Beta emission. What is the mass number and the atomic

${}_{91}^{233}\text{Pa}$

91 number of the element formed?

(1 mark)

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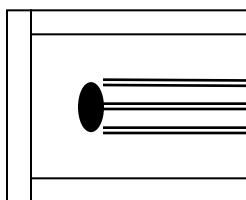
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8. **1996 P1A Q 20**

Complete the diagram below to show how  $\alpha$  and  $\beta$  particles from radioactive can be distinguished from each other. Label your diagram clearly. (3 marks)



Source of radiation

Paper

Metal foil

9. **1997 P1A Q 7**

M grammes of a radioactive isotope decayed to 5 grammes in 100 days.

The half -life of the isotope is 25 days.

(a) What is meant by half-life?

(1 mark)

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(b) Calculate the initial mass M of the radioactive isotope.

(2 marks)

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10. 1998 P1A Q1

An isotope of Uranium  $^{234}_{94}\text{U}$ , decays by emission of an alpha particle to thorium. Th.



(a). Write the equation for the nuclear reaction undergone by the isotope. (1 mark)

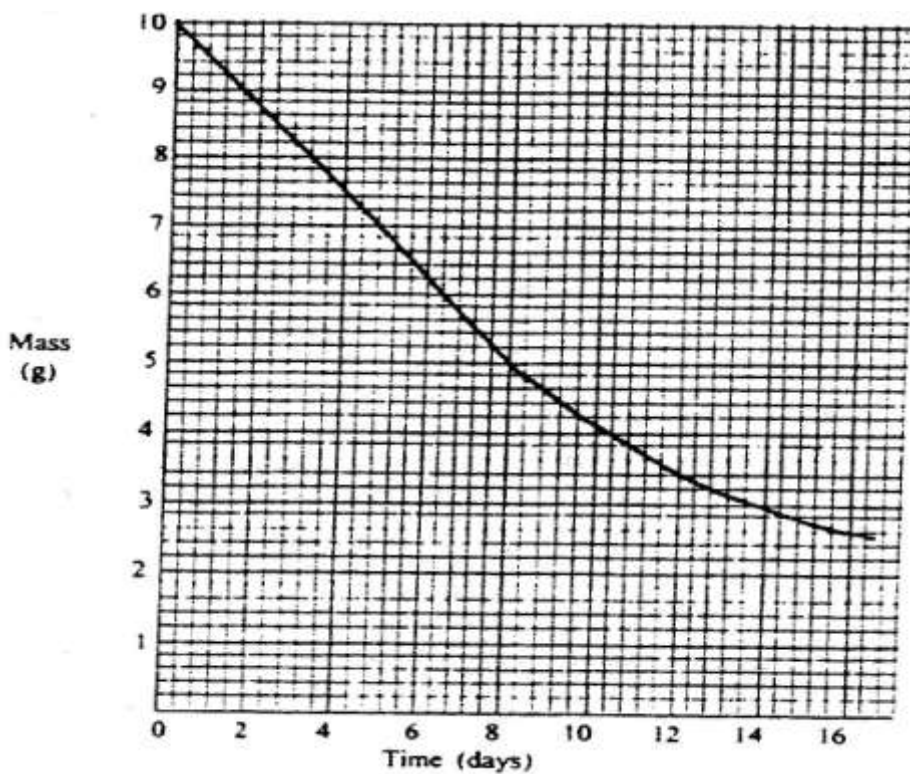
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(b). Explain why it is not safe to store radioactive substances in containers made from Aluminum sheets. (1 mark)

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11 1999 Q 26

The graph below shows the mass of a radioactive isotope plotted against time



(a) Using the graph, determine the half – life of the isotope

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(b) Calculate the mass of the isotope present after 32 days

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**12. 2000 Q 13**

A radioactive isotope  $X_2$  decays by emitting two alpha ( $\alpha$ ) particles and one beta ( $\beta$ ) to form  $^{214}_{83}\text{Bi}$



(a) What is the atomic number of  $X_2$ ?

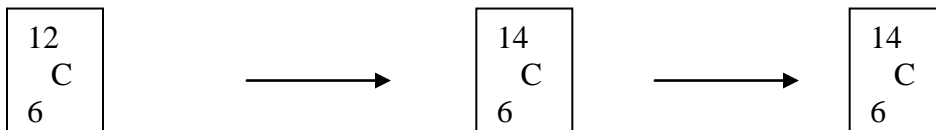
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(b) After 112 days,  $\frac{1}{16}$  of the mass of  $X_2$  remained. Determine the half life of  $X_2$

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**13. 2001 Q 1**

Study the nuclear reaction given below and answer the questions that follow.

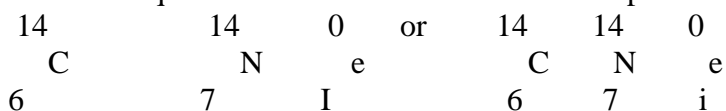


(a) 12 and 14 are isotopes. What does the term isotopes mean? What does the term isotope mean?



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(b) Write an equation for the nuclear reaction in step II

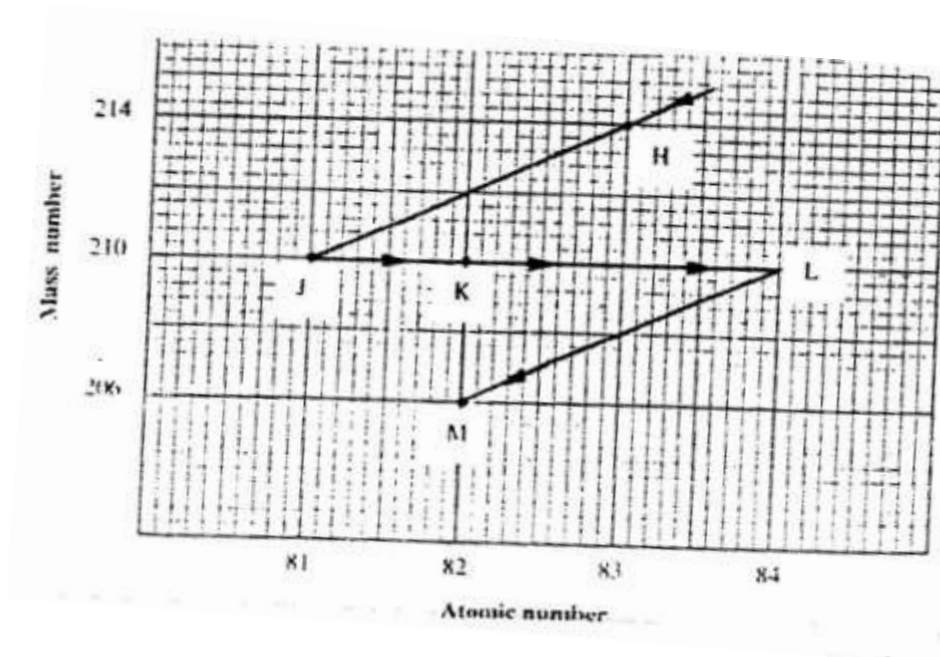


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(c) Give one use of  $^{14}\text{C}$

13. 2002 Q 10

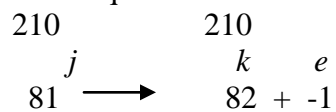
The graph below represents a radioactive decay series for isotope H. Study it and answer the questions that follow



(a) Name the type of radiation emitted when isotope H changes to isotope J.

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(b) Write an equation for the nuclear reaction that occur when isotope J changes to isotope K



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c) Identify a pair of isotope of an element in the decay series

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14. 2005 Q 14

100 g of a radioactive substance was reduced to 12.5 g in 15.6 years.  
Calculate the half – life of the substance.

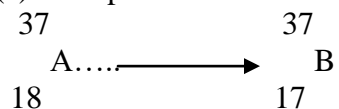
(2 marks)

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**15. 2006 Q 4**

(a) Complete the nuclear equation below.

(1 mark)



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(b) State one:

(i) Use of radioisotopes in agriculture

(1 mark)

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(ii) Danger associated with exposure of human beings to radioisotopes

(1 mark)

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**17. 2007 Q 14**

a) Distinguish between nuclear fission and nuclear fusion.

(2 marks)

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b) Describe how solid wastes containing radioactive substances should be disposed of.

(1 mark)

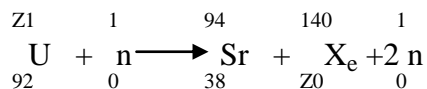
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**18. 2008 Q 24**

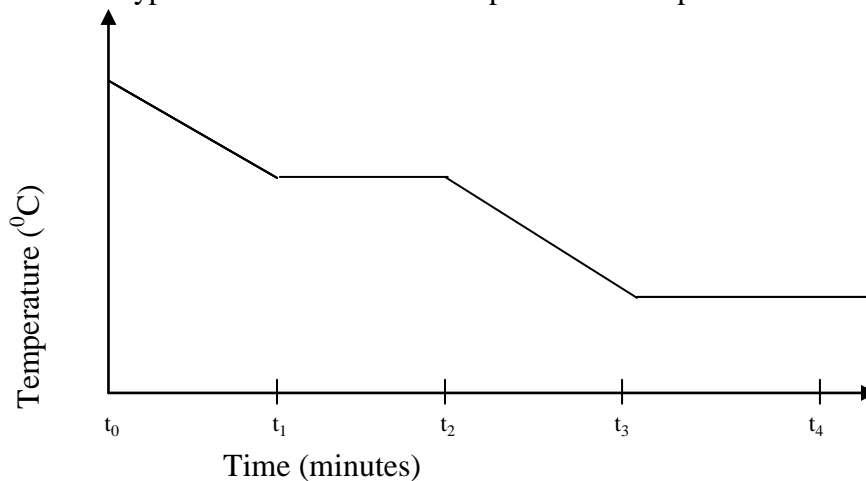
- a) A radioactive substance emits three different particles. Give the symbol of the particle with the highest mass. (1 mark)

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- b) (i) Find the values of  $Z_1$  and  $Z_2$  in the nuclear equation below



- ii) What type of nuclear reaction is represented in b (i) above? (1 mark)



Give the name of the:

- a) Process taking place between  $t_0$  and  $t_1$ . (1 mark)

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- b) Energy change that occurs between  $t_3$  and  $t_4$

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**19. 2009 Q 6d P2**

- (d) Naturally occurring uranium consist of three isotopes which are radioactive.

Isotopes	234 u	235u	238u
Abundance	0.01%	0.72%	99.27%

- (i) Which of these isotopes has the longest half-life? Give reasons. (1 mark)

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- (ii) Calculate the relative atomic mass of uranium. (2 marks)

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- (iii)  ${}_{92}^{235}\text{U}$  is an alpha emitter .If the product of the decay of this nuclide



${}_{92}^{238}\text{U}$  is thorium (Th). Write a nuclear equation for the process. (1 mark)

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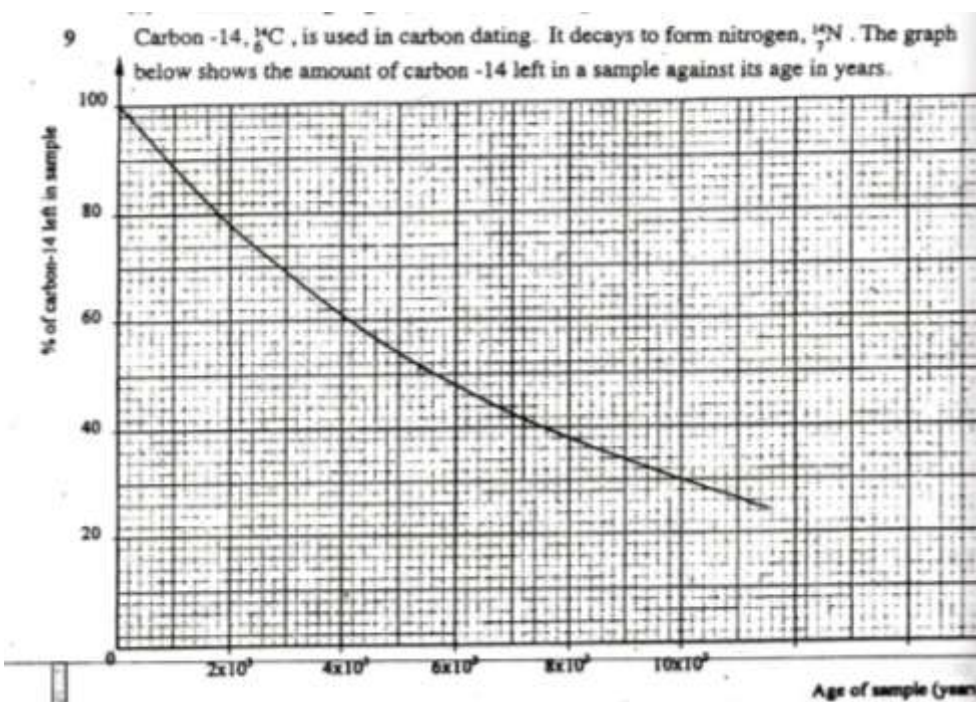
iv) State one use of radioactive isotopes in the paper industry (2 marks)

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20. 2010 Q 9

Carbon -14,  ${}_{6}^{14}\text{C}$ , is used in carbon dating. It decays to form nitrogen,  ${}_{7}^{14}\text{N}$ . The graph below shows the amount of carbon -14 left in a sample against its age in years.



a) Write a nuclear equation for the decay process of carbon -14. (1 mark)

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b) From the graph, determine the;

i) Half-life of carbon -14; (1 mark)

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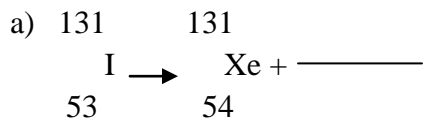
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ii) Percentage of carbon -14 in a sample whose age is 1950 years. (1 mark)

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**21. 2011 Q 2**

Complete the nuclear equation below:



b) The half life of  $\begin{array}{c} 131 \\ 53 \end{array} \text{I}$  is 8 days.

Determine the mass of  $\begin{array}{c} 131 \\ 53 \end{array} \text{I}$  remaining if 50 grammes decayed for 40 days.

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c) Give one harmful effect of radioisotopes. (1 mark)

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**22. 2012 Q9 P1**

120g of iodine – 131 has a half life of 8 days decays for 32 days. On the grid provided, plot a graph of the mass of iodine – 131 against time. (3 marks)