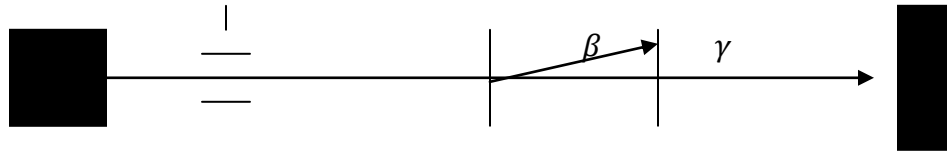
RADIOACTIVITY MARKING SCHEME

1. 1989 Q16



Source of α,βand γRays | Electrically charged plates | Thin paper | Sheet Aluminium | Thick lead

3. 1991 Q13

Mass number 230-4 =226

Atomic number 90-2 =88

4. 1992 Q17

(a) 216-208 =8 Hence M =2

(b) N=2

5. 1993 Q14

(a) O,-1

(b)

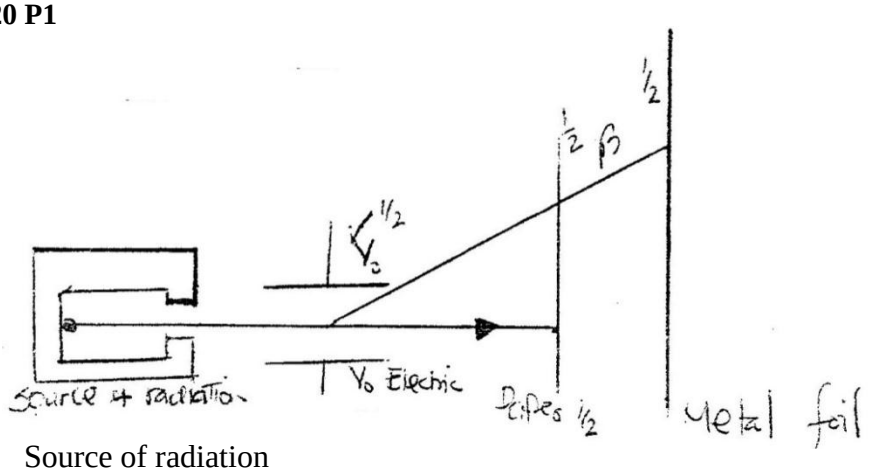
- Nuclear reactors
- Atomic bomb/hydrogen bond
- Detecting leakages
- Studying photosynthesis
- Security measurements
- Treatments of cancer
- Sterilize surgical instruments
- Dating of artifacts and rocks
- Killing bacteria

7. 1995 Q30 P1

a) 100g of Pa 50g if Pa 25g Pa 12.5 (g)
. . 3t ½ = 81($^1/_2$) t=1/2 = 27 days ($^1/_2$) (2 marks)

b) Mass number – 233 ($^1/_2$)
Atomic number – 92($^1/_2$) (1 mark)

8. 1996 Q20 P1



Source of radiation
For electric or magnetic field
For showing how α and β are attracted
For showing how α stopped by paper, β by metal foil.

9. 1997 Q7 P1

(a) - Time taken for a given mass of radioactive isotope to reduce to Half

(b) No. of t ½ = $\frac{100}{25} = 4$

$\frac{5}{M} = (^1/_2)^4 = M = 80g$

10. 1998 Q1 P1

(a) - $^{234}U \rightarrow {}^{230}Th + {}^{4}He$

(b) - Gamma rays will penetrate through the walls of the container and causes damage

11. 1999 Q26 P1

(a) t ½ is 8 days

(b) 10 ⟶ 5 ⟶ 2.5 ⟶ 1.5 ⟶ 0.625

(Proper division 2marks/ poor arithmetic $^1/_2$)

OR

Let the mass of the isotope be Xg

Number of t $^1/_2$ = 32/ 8 = 4

X / 10 = $(^1/_2)^4$

X = 0.625

13. 2001 Q1 P1

(a) Atoms of the same element that differ in mass numbers, same number of protons but different number of neutrons

(b) $^{14}_{6}C \longrightarrow {}^{14}_{7}N + {}^{0}_{I}e$ or $^{14}_{6}C - {}^{14}_{7}N \rightarrow {}^{0}_{i}e$

(c) Carbon dating ‖ Isotope tracers ‖ tracing of biological processes

14. 2002 Q10 P1

(a) Alpha or He (10)

(b) $^{210}_{81}J \rightarrow {}^{210}_{82}k + {}^{e}_{-1}$

(c)K and M

15. 2005 Q14 P1

Year	Mass (g)	
0	100	
5.2	50	1st half- life
10.4	25	2nd half- life
15.6	12.5	3rd half - life

Let half- life be x

3x = 15.6

X=5.2 yrs

16. 2006 Q4 P1

a) $37 + 0 \rightarrow 37$

$18^{A} - 1^{e} \quad 17^{B}$

b) i)Studying rate of absorption of phosphorus from a fertilizer (1 mark)

ii) May result to babies with deformities

May cause cancer (1 mark)

17. 2007 Q14 P1

(a) Nuclear fusion is where two light nuclei combine to give a heavy release of energy while nuclear fusion is where a large nuclear splits into smaller nuclei with the release of enormous amount of energy.

(b) Wrap with aluminium or lead foil and bury them deep underground

18. 2008 Q24 P1

(a) $^{4}_{2}He$ reject>, He, $^{4}_{2}He^{+}$

(b)(i) $Z_1 = 235 \quad Z_2 = 54$

(ii) Nuclear fission

Accept fission

19. 2009 Q6d P2

(d) i. $^{238}_{920}U$ it is the most abundant

(ii) $\frac{0.01x\ 2.34 + 0,72 \times 235 + 238 \times 99.27}{100}$

(2.34 + 169 .2 + 236.2626)/100 ½ mark

= 23797. 80

100
= 237.978 ½ mark

(iii) $^{235}_{92}U \rightarrow ^{231}_{90}Th + ^{4}_{2}He$

(iv) Control thickness of paper

20. 2010 Q9 P1

a) $^{14}_{6}C \longrightarrow ^{14}_{6}N + ^{0}_{-1}e$

b) i) 5.6×10^3 yrs (5.6 – 5.7) $x10^3$

ii) 78% - or + 0.4

21. 2011 Q2 P1

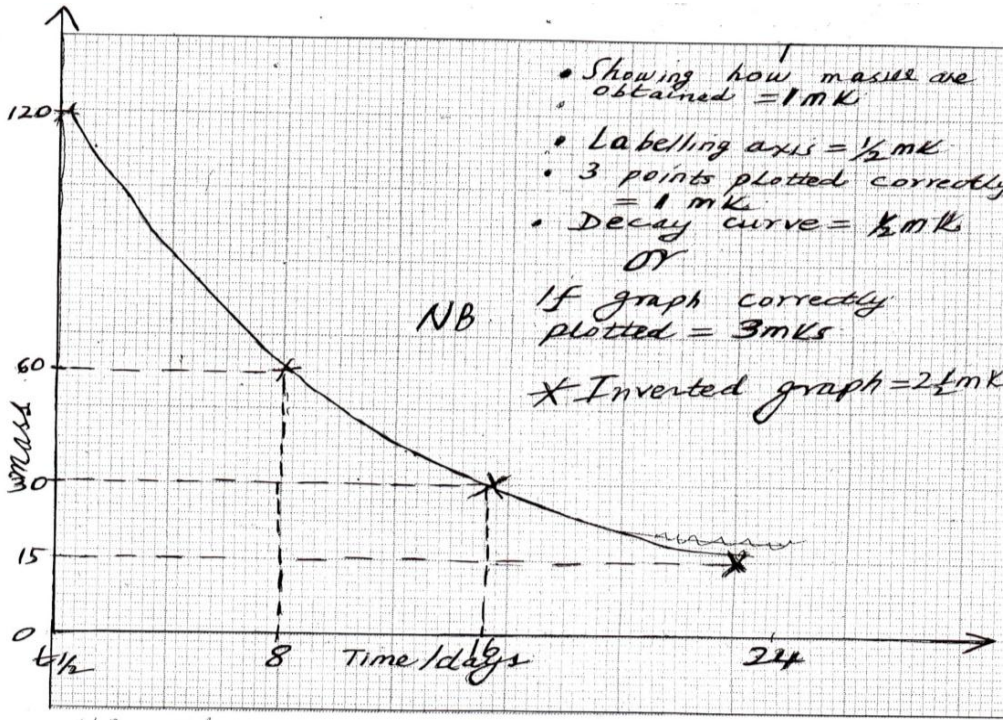
a) $^{131}_{53}I \longrightarrow ^{131}_{54}Xe + ^{0}_{-1}Oe$

b) 50g ⟶ 25g ⟶ 12.5g ⟶ 6.25g ⟶ 3.125g ⟶ 1.5625g

c) -Instant / cause death
-Cause cancer
-Cause gene mutation

22. 2012 Q9 P1

Mass	120	60	30	15
Time	0	8	16	24



NB. Showing how masses are obtained / or table award 1mark