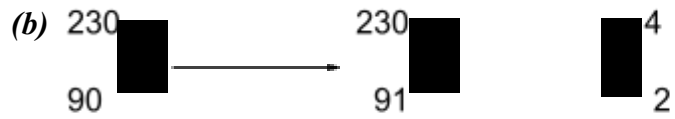
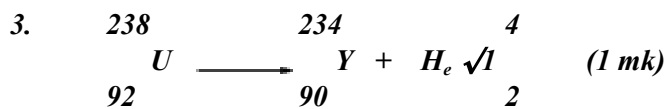


Radioactivity

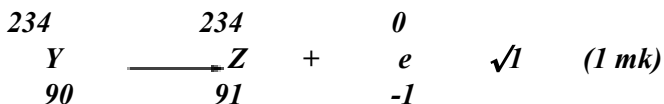
1. $u = 234 \sqrt{}$ $V = 91 \sqrt{}$

2. (a) *Nuclear fusion is a process whereby smaller nuclei combine to form a larger one at high temperatures;*
Nuclear fission is whereby a large nuclide splits to form smaller one when hit by a neutron





2



4. (a) Is an atom or atomic nucleus characterized by its atomic number and mass number

(b) $\frac{14}{2} = 7$ from the graph

$\therefore$ half-life is 10 days

(c) Destroys physical properties of metals e.g. lower tensile strength

5. a) nuclear reactions involve the nucleus of an atom but chemical reactions involved valence electrons

- Nuclear reactions are independent of external factors but chemical reactions depend on external factors
- In nuclear reactions new elements are formed but no new elements are formed in chemical reactions (any one of them)

b) i) step I-Alpha $\sqrt{1/2}$

II- Beta $\sqrt{1/2}$

ii) $Z = 234 \sqrt{1/2}$

$A = 92 \sqrt{1/2}$

$1^{\text{st}} t^{1/2}$

$2^{\text{nd}} t^{1/2}$

II. $100\% \longrightarrow 50\% \longrightarrow 25\%$

$2t^{1/2} = 48 \text{ hours}$

$t^{1/2} = ?$

$t^{1/2} = \frac{48}{2} = 24 \text{ hours}$

6. a) Hydrogen. $\sqrt{1}$

b) (i) A No effervescence takes place. $\sqrt{1/2}$

(ii) B There is effervescence $\sqrt{1/2}$ and the gas produced turns lime water into white precipitate. $\sqrt{1/2}$

7. (a) 8 (protons number same as atomic number)

(b) $27 - 13 = 14$

8. (a) No. of half-lives (n) = $\frac{120}{20} = 6$

$$Y \times \left(\frac{1}{2}\right)^6 = 3.5$$

$$Y = 3.5 \times 2^6$$

$$Y = 224 \text{ g}$$

(all steps for equation)

OR:

2	11	5	2	1	7.	3.
2	2	6	8	4	0	5
4	0	0	0	0	1	1
0	0	0	0	0	0	2
					0	0

(b) – To study the rate of absorption of fertilizer by plants using radioactive phosphorous

- *Tracing chemical and physiological processes such as photosynthesis*
- *Sterilizing equipment* (Iny one)

9. a) $\frac{14}{6} Y - \frac{14}{7} Z + 0$

b) carbon dating

10. - Gamma rays are used to sterilize surgical equipment
- Detection and treatment of goiter

11. i) U,V,Y,Z All the 4 or nay 3 exclusively correct penalize $\frac{1}{2}$ mk if wrong answer
ii) YZ is/are included any 2 correct $\frac{1}{2}$ mk

12. No. of $t \frac{1}{2} = \frac{90}{15} = 6$

Remaining Fraction = $(\frac{1}{2})^6 = \frac{1}{64}$

Mass left = $\frac{1}{64} \times 2 = 0.03125g$

13. a) -1 C

b) $100 - 50 - 25 = 12.5$

$3t \frac{1}{2} = 15.6$

$T \frac{1}{2} = \underline{15.6}$

3

= 5.2 years