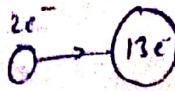


(1)



$$K.E = 7.7 \text{ MeV}$$

$$P.E = 75\% \text{ of } K.E$$

$$= \frac{75}{100} \times 7.7 \text{ MeV}$$

$$= 5.775 \text{ MeV}$$

$$P.E = \frac{k e^2 Q_1 Q_2}{r_{\min}}$$

$$P.E = \frac{k Q_1 Q_2}{r_{\min}}$$

$$5.775 = \frac{k \cdot 2e \cdot 13e}{r_{\min}}$$

$$k \cdot e^2 = 1.44 \text{ MeV}$$

$$5.775 = \frac{1.44 \times 26}{r_{\min}}$$

$$r_{\min} = \frac{1.44 \times 26}{5.775} = 6.48 \text{ fm}$$

$$= 6.48 \times 10^{-15} \text{ m}$$

(2)

$$E = mc^2$$

$$m = E/c^2$$

$$= \frac{J}{m^2/s^2}$$

$$= \frac{N \cdot m \times s^2}{m^2}$$

$$= \frac{N \cdot s^2}{m}$$

(d.)

(3) 44d

(4)

$$qVB = \frac{mv^2}{r}$$

$$\frac{q}{m} = \frac{v}{Br} = \frac{1.54 \times 10^6 \times 10^3}{7.08 \times 4.52} = 4.81 \times 10^7 \text{ C/kg}$$

$$qVB = \frac{mvl}{r}$$

$$r = \frac{mvl^2}{qVB} \therefore \frac{mv}{qB} = 0.018$$

$$= \left(\frac{m}{q}\right) \times \left(\frac{v}{B}\right)$$

$$= 5.68 \times 10^{-12} \times \frac{2.5 \times 10^6}{2 \times 10^{-3}}$$

$$= 7.1 \times 10^{-3}$$

(b.)

$$\frac{1}{2}mv^2 = 4.5 \text{ MeV}$$

$$\frac{1}{2}v^2 = \frac{9 \times 10^6 \times 1.6 \times 10^{-19}}{1.6728 \times 10^{-27}}$$

$$v^2 = 8.61 \times 10^{14}$$

$$v = 2.93 \times 10^7 \text{ (b.)}$$

$$z \xrightarrow{\beta^-} z+1 \xrightarrow{\alpha} z-1 \xrightarrow{\alpha} z-3 \xrightarrow{\beta^+} z-4 \xrightarrow{\alpha} z-6$$

(c.)

(d.)

b.

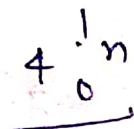
9.

mass conservation

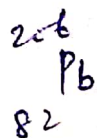
$$239 + 1 = 137 + 99 + x$$

$$240 = 236 + x$$

$$x = 4$$



10.



$$\begin{aligned} \text{no. of neutrons} &= 206 - 82 \\ &= 124 \end{aligned}$$

11.

2 MeV.

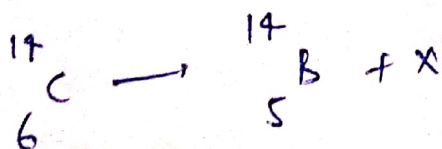
~~1 MeV~~ 9.

$$1 \text{ amu} = 931.5 \text{ MeV.}$$

$$\text{for } 2 \text{ MeV} = \frac{2}{931.5} \text{ amu}$$

$$= 2.1 \times 10^{-3} \text{ amu.}$$

12.



13. positron

13. 14.

14. $q = \frac{F_u \times d}{V}$

$F_u = mg.$

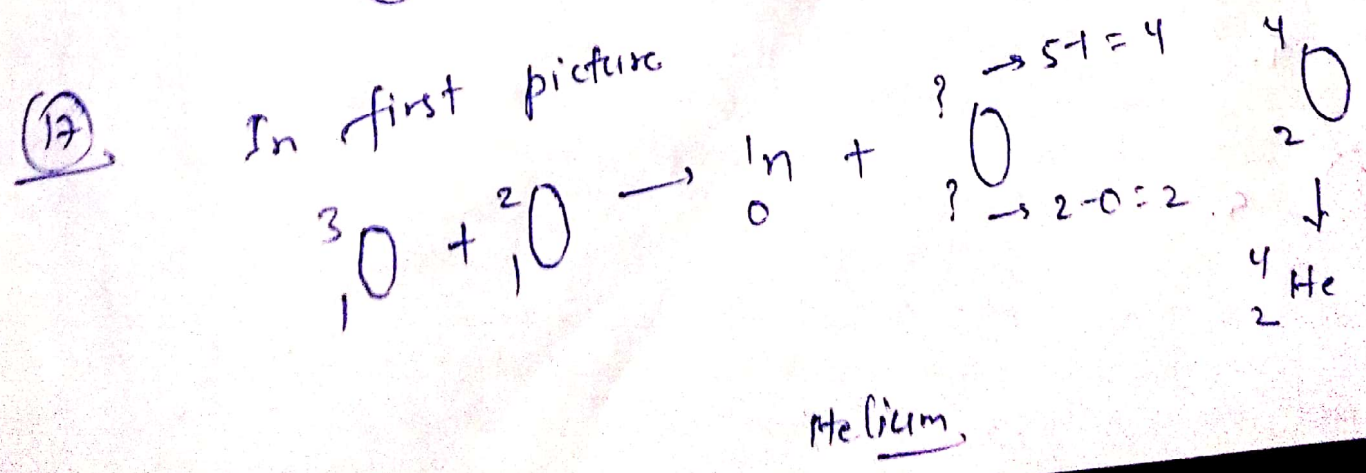
$q = \frac{mg \cdot d}{V} = \frac{7.2 \times 10^{-16} \times 9.8 \times 45 \times 10^{-3}}{99}$
 $= 2. \times \underline{1.6 \times 10^{-19}}. = 2e.$

9.

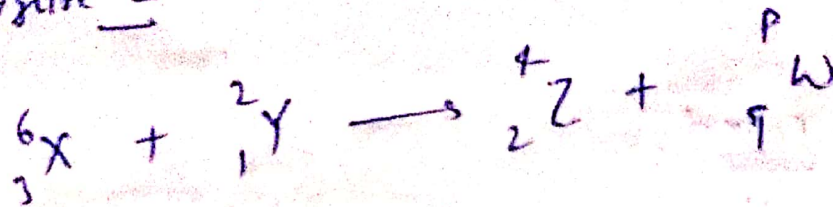
15. Avg. binding energy per nucleon of ${}^{56}_{26}\text{Fe} = 8.5$
 for 56 = 56×8.5
 $= 476 \text{ MeV}$

16. By seeing graph.
 half attained at $t = 1.8 \text{ hr.}$

(d).



In figure 2



$$6 + 2 = 4 + P$$

$$P = 4$$



$$3 + 1 = 2 + 9$$

$$9 = 2$$

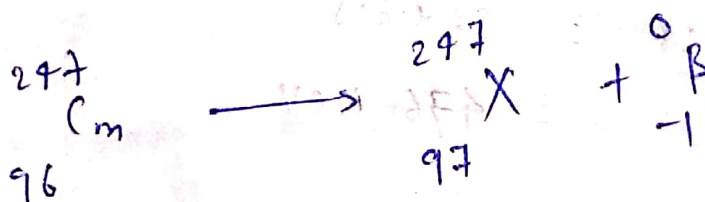


(d) helium; helium

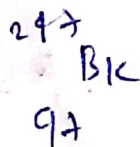
(18) d.

(19) d

(20)



(22)



(21) d.

(22) g.

(23)

a.

(24)

$$25.75 = 824 \left(\frac{1}{2} \right)^n \leftarrow \text{no of half life}$$

$$\left(\frac{25.75}{824} \right) = \left(\frac{1}{2} \right)^n$$

$$\frac{1}{32} = \left(\frac{1}{2} \right)^n$$

$$\left(\frac{1}{2} \right)^5 = \left(\frac{1}{2} \right)^n$$

$$n = 5$$

$$\text{total time} = 5 \times 550 = 2.75 \times 10^4$$

$$a, b, c, d = 2754.$$

(25)

$$\Delta m = 212.035 - 4003 - 207.989$$
$$= 0.043 \text{ amu}$$

$$\text{In ev} = 0.043 \text{ amu} \times 931.5 \text{ ev}$$

$$= 40.05 \times 10^6 \text{ ev}$$

$$= 4005 \times 10^7$$

$$a, b, c, d = 1, 0, 0, 7.$$