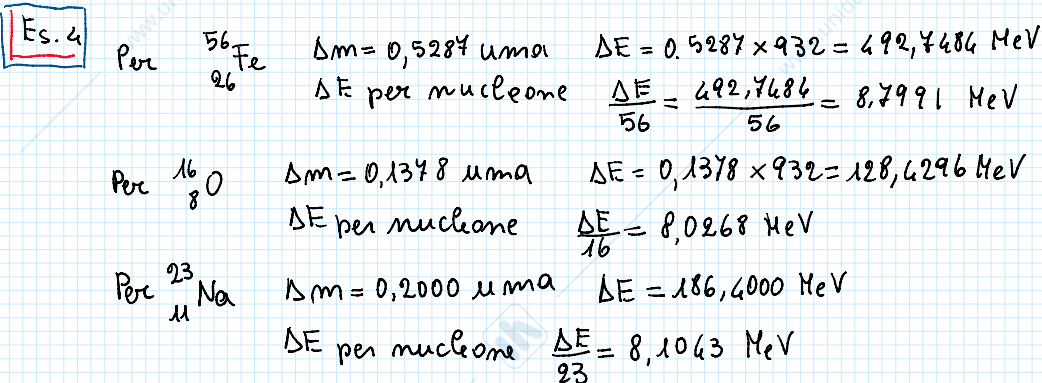
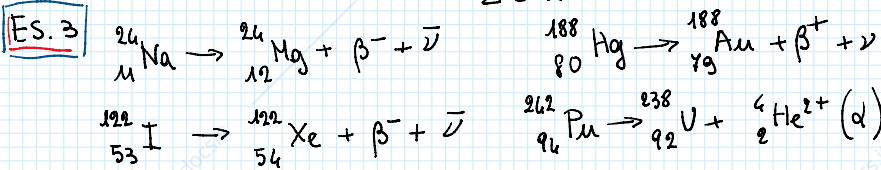
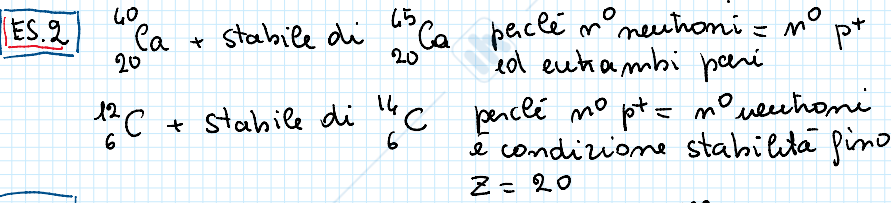
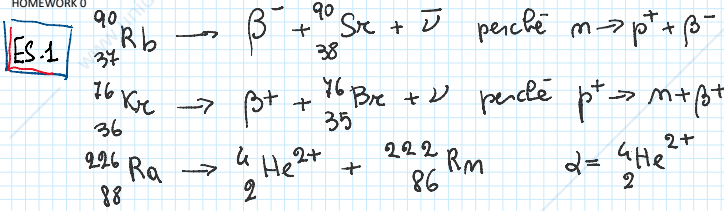


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HOMEWORK 0

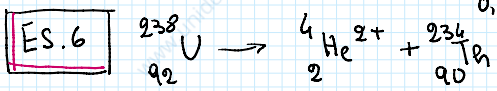


ES.5

$t_{1/2} = 704 \cdot 10^6 \text{ anni}$ $\lambda = \frac{0,693}{t_{1/2}} = \frac{0,693}{704 \cdot 10^6} = 0,98 \cdot 10^{-9}$

$N = N_0 e^{-\lambda t}$

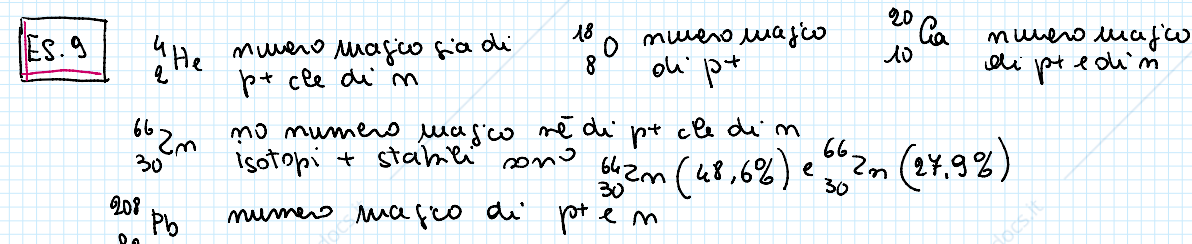
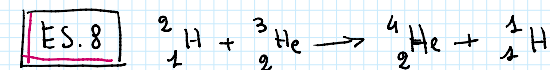
$$N_0 = \frac{N}{e^{-\lambda t}} = \frac{N}{e^{-0,98 \cdot 10^{-9} \times 4,5 \cdot 10^6}} = \frac{N}{e^{-4,41 \cdot 10^{-3}}} = \frac{N}{0,995} = N \cdot 1,0044$$



ES.7

$\Delta m = 0,1 \cdot 10^{-3} \text{ g} = 0,1 \cdot 10^{-6} \text{ kg} = 10^{-7} \text{ kg}$

$\Delta E = m \cdot c^2 = (2,99 \cdot 10^8 \text{ m/s})^2 (10^{-7} \text{ kg}) = 8,94 \cdot 10^9 \text{ J}$



ES.10

$${}_{19}^{40}\text{K} \rightarrow {}_{18}^{40}\text{Ar} + \beta^+ + \nu \quad t_{1/2} = 1,27 \cdot 10^9 \quad N = N_0 \cdot e^{-\lambda t}$$

$\lambda = \frac{0,693}{t_{1/2}} = \frac{0,693}{1,27 \cdot 10^9} = 0,55 \cdot 10^{-9}$ $\frac{N_0}{N} = 4,2 = \frac{1}{e^{-\lambda t}}$ che trasferisce in forma

$$\lambda = \frac{0.693}{t_{1/2}} = \frac{0.693}{1.27 \cdot 10^9} = 0.55 \cdot 10^{-9} \quad \frac{N_0}{N} = 4.2 = \frac{1}{e^{-\lambda t}} \text{ che trasferisco in forma logaritmica}$$

$$\ln 4.2 = \ln 1 - \ln e^{-\lambda t} \quad 1.43 = 0 + \lambda t = 0.55 \cdot 10^{-9} \cdot t$$

$$t = \frac{1.43}{0.55 \cdot 10^{-9}} = 2.6 \cdot 10^9 \text{ anni}$$

Es. 11

$$V_{\text{cubetto}} = (1.5 \text{ cm})^3 = 3.375 \text{ cm}^3 = 3.375 \text{ mL}$$

$$\Rightarrow V_{\text{finale}} = V_i + V_c = (31.8 + 3.375) \text{ mL} = 35.175 \text{ mL}$$

Es. 12

$$d = \frac{m}{V} = 4.5 \text{ g/cm}^3 \quad \text{massa in g} = d \cdot V = 4.5 \times 4.6 = 34.5 \text{ g} = 34.5 \cdot 10^{-3} \text{ kg}$$

il peso è dato da $m \cdot g = 338.445 \cdot 10^{-3} \text{ N}$

Es. 13

$$\text{massa atomica di campione materiale} = (34.969 \times 0.7578) + (36.966 \times 0.2422) = 26.499 + 8.953 = 35.453 \text{ uma}$$

Es. 14

$$\text{deve essere } 10.81 = 10.0129 \cdot x + 11.0093(1-x)$$

$$x \cdot 0.9964 = 0.1983 \Rightarrow x = 0.20$$

quindi $^{10}_5\text{B}$ è presente al 20% e $^{11}_5\text{B}$ all'80%

Es. 15

$$n^{\circ} \text{ moli di Mn} = \frac{3.22 \cdot 10^{20}}{6.022 \cdot 10^{23}} = 0.5347 \cdot 10^{-3}$$

$$\text{massa} = n^{\circ} \text{ moli} \times \text{massa molare} = 0.5347 \cdot 10^{-3} \text{ moli} \times 54.938 \frac{\text{g}}{\text{mole}} = 29.37 \cdot 10^{-3} \text{ g}$$

Es. 16

$$n^{\circ} \text{ moli di C} = \frac{\text{massa totale}}{\text{massa molare}} = \frac{315 \text{ g}}{12 \frac{\text{g}}{\text{mole}}} = 26.25 \text{ moli}$$

Es. 18

$$\text{massa} = n^{\circ} \text{ moli} \times \text{massa molare} = 1.50 \cdot 10^2 \cdot 144.676 = 217 \text{ g}$$

$$\text{massa molare di CdS} = (112.41 + 32.066) \frac{\text{g}}{\text{mole}} = 144.476 \frac{\text{g}}{\text{mole}}$$

Cd S

Es. 17

$$\text{massa} = n^{\circ} \text{ moli} \times \text{massa molare} = 2.5 \times 18.015 = 45.04 \text{ g}$$

$$\text{massa molare H}_2\text{O} = (1.008 \times 2 + 15.999) \frac{\text{g}}{\text{mole}} = 18.015 \frac{\text{g}}{\text{mole}}$$

Es. 19

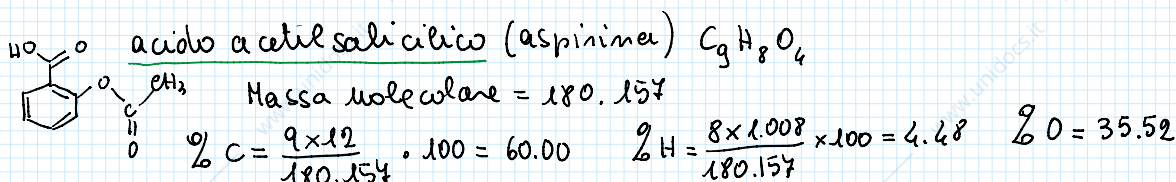
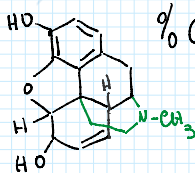
monofina $\text{C}_{14}\text{H}_{19}\text{NO}_3$ massa molare = $(12.00 \times 14) + (1.008 \times 19) + (1 \times 14.007) + (3 \times 15.999) = 285.338$ che è anche il numero che si indica come massa molecolare o peso molecolare

$$\% \text{C} = \frac{14 \times 12}{285.338} = 0.7149 \quad \% \text{H} = \frac{19 \times 1.008}{285.338} = 0.0671$$

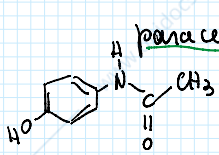
$$\% \text{N} = \frac{14.007}{285.338} = 0.0491 \quad \text{le \% di O di solito si calcolano per differenza}$$

$$\Rightarrow \% \text{O} = 1 - (0.7149 + 0.0671 + 0.0491) = 0.1682$$

$$\Rightarrow \text{C } 71.49\% ; \text{H } 6.71\% ; \text{N } 4.91\% \text{ e O } 16.82\%$$



$\% C = \frac{4 \times 12}{180.154} \cdot 100 = 60.00$ $\% H = \frac{0 \times 1.008}{180.154} \times 100 = 0.00$



paracetamolo (acetaminofina) $C_8H_9NO_2$ MM = 151.163

$\% C = \frac{8 \times 12.00}{151.163} \cdot 100 = 63.56$ $\% H = \frac{9 \times 1.008}{151.163} \times 100 = 6.00$

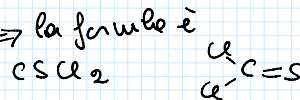
$\% N = \frac{14.00}{151.163} \times 100 = 9.26$ $\% O = 21.17$

ES. 20

a) 10.4 % C $\frac{10.4}{12} = 0.866$ 1 i rapporti relativi sono

27.8 % S $\frac{27.8}{32.066} = 0.867$ 1 \Rightarrow la formula è

61.7 % Cl $\frac{61.7}{35.453} = 1.74$ 2



cloruro di tiocarbomile
MM 114.982

b) 62.1 % C $\frac{62.1}{12} = 5.17$ 5.98

5.21 % H $\frac{5.21}{1.008} = 5.17$ 5.98

12.1 % N $\frac{12.1}{14} = 0.864$ 1

20.59 % O $\frac{20.59}{15.999} = 1.29$ 1.5

12 formula
x2 12 $C_{12}H_{12}N_2O_3$
2 MM 232.235

