06/07/2013

2-B1 VOLUME = $50\,m^3$ = 50 000 cm^3 HELIUM DENSITY = $0,1785 \times 10^{-3}\ g/cm^3$

DENSITY = $\frac{MASS}{VOLUME}$ → MASS = DENSITY (VOLUME)

$M = 5 \times 10^7\,cm^3 (0,1785 \times 10^{-3}\ g/cm^3) = 8,925 \times 10^3\,g$

He (MOLAR_MASS) = 4,0026 → $\frac{4,0026}{N_A} = 6,64607721 \times 10^{-24}$

$\frac{8,925 \times 10^3\,g}{6,64607721 \times 10^{-24}} = 1,34289743 \times 10^{27}$ Atoms

2-B2 WATER IN OCEANS OF EARTH (ESTIMATIVE) = $10^{21}\,kg = 1 \times 10^{24}\,g$

$O = 15.9994/N_A = 2,65660440 \times 10^{-23}\,g$ | $H = 1,00797/N_A = 1,67367372 \times 10^{-24}\,g$ | $H_2O = 2(H)+(O) = 2,9913914 \times 10^{-23}\,g$

Dye = 2g → $200/N_A = 3,32078003 \times 10^{-22}\,g$ (or 10^{-24})

MASS_OCEANS / H_2O = $3,34298437 \times 10^{49}$ molecules of H_2O in the oceans

MASS_DYE / DYE = $6,02250000 \times 10^{21}$ molecules of DYE (or 10^{23})

$\frac{molecules\_dye}{molecules\_oceans} = 1,80153400 \times 10^{-28}$ DYE/H_2O (or 10^{-26})

$380g/H_2O = 1,20347437 \times 10^{25}$ Atoms × DYE/H_2O = $2,1681 \times 10^{-3} = \frac{1}{500}$ (or $2,1681 \times 10^{-1} = \frac{1}{5}$)

2-B3 ^1_1H = 1.008 g/mole = $1,67372354 \times 10^{-24}\,g$

$1,008\,g / 6,0225 \times 10^{23}$ = ?

2-B4 $^{239}_{94}Pu$ $239g/N_A = 3,96845164 \times 10^{-22}$ g/Atom

1 Mol = 1 Milion Atoms = $3,96845764 \times 10^{-16}$

2-B5 10L H_2O (WATER) SPECIFIC GRAVITY = 1.00 g/cm³

5L Glycerin SPECIFIC GRAVITY = 1.26 g/cm³

$\frac{39,6825397}{100} = 0,396825397$ $\frac{1.26\,g/cm}{1.00\,g/cm} = 1.26$ 11(1,26/3) = 1,42

2-B6 $^{10}_5B$ 19% of it AVG WEIGHT OF BORON = 10,81 ✓

$^{11}_5B$ 81% of it $(10 \times 0,19) + (11 \times 0,81) = 10,81$

2-B7 1000 cm³ Liquid CARBON (CCl_4) a) MASS = 1595 g ✓

1,595 g/cm³ $(C/N_A)+(Cl_4/N_A) = 2,554 \times 10^{-22}$ b) Mols in CCl_4 = $6,24976062 \times 10^{24}$

2-B8 $^{13}Al = 26.9815$ $4,48011623 \times 10^{-23}\,g$

2-C1 $F = F1 + F2 = \frac{10^{-10}}{x^8} + \frac{10^{-80}}{x^9}$ x = distance in meters

a) calculate F1, F2 and the total force of F for the following values:

$x = 10^{-8}\,m, 10^{-9}\,m, 10^{-10}\,m, 10^{-11}\,m, 10^{-12}\,m$.

$F = \frac{10^{-10}}{(10^{-8})^8} + \frac{10^{-80}}{(10^{-8})^9}$ $F = 1 \times 10^6$ | $F = \frac{10^{-10} + 10^{-80}}{(10^{-9})^8 (10^{-9})^9}$ $F = 1 \times 10^{-1}$

$F = 1 \times 10^6 + 1 \times 10^{-8}$ $F = 1 \times 10^{-1} + 1,1 \times 10^{-80}$

→ 04/08/2013 (SOLVED)

9,05 ÷ 6,146 = 1,36 } 06/07

$1,36 \times 10^{27}$

06/08/2013 → Corrects - → must be reviewed

06/08/2013

10/09/2018

$1,25 \times 10^{24}$

24/09/2018

01/10/2018

20/07/2013