I need help with 5 chemistry questions and would need work to be shown.

Question1

    A. Measure out 0.130 moles of salt (NaCl) into a blue, dry cup. You need to convert to mass in grams. Show work:

Solution

m = M·n;

m – mass, M – molar mass, n – chemical amount of substance.=

M(NaCl) = 22.99+35.45 = 58.44 (g/mol);

m(NaCl) = 58.44·0.130 = 7.60 (g).

Answer: 7.60 g

Question 2
B. Put 4.03x10^23 molecules of water into a clear cup. You need to convert to mass in grams. Show work:

Solution

m = M·n;

n = N/N_A,

n – chemical amount of substance, N – number of particles (atoms/ molecules/ ions), N_A – Avogadro number , $N_A = 6.022·10^{23}$ mol^{-1}.

Find chemical amount of $4.03·10^{23}$ molecules of water:

$n(H_2O) = 4.03·10^{23}/6.022·10^{23} =0.669$ (mol);

Find mass of water:

$M(H_2O) = 1.01·2+16.00 =18.02$ (g/mol),

$m(H_2O) = 18.02·0.669 = 12.06$ (g).

Answer: 12.06 g.

Question 3
C. Obtain a small sample of metal from your teacher. Determine how many atoms it contains. Show work: the metal sample weighs 142g

Solution

n= N/N_A, then N = N_A·n;

m = M·n, then n =m/M.

In this task we do not know the metal (it can be Zn, Cu, Fe, Al, Au and so on).

We will make mathematical calculation for one of them (for example Al), knowing it's atomic mass. For any other metal mathematical calculation is the same.

Ar (Al) = 26.98.

Find chemical amount of 142 g of Al:

n(Al) = 142/26.98 = 5.26 (mol);

N (Al) = $6.022 \cdot 10^{23} \cdot$ 5.26 =$31.7 \cdot 10^{23}$ = $3.17 \cdot 10^{24}$ (atoms).

Answer: $3.17 \cdot 10^{24}$ atoms

Question 4
1. Your metal element is trading at $0.000656/g on the stock market. What is the value of your sample of metal?

Solution

We have 142 g of metal element that cost x $.

We know that 1 g of metal element cost 0.000656 $.

Solve the proportion: 142/1 =x/0.000656;

x= 0.093152 ($)

Answer: 0.093152 $

Question 5
2. Restate the mathematical relationship between number of moles and masses, or number of molecules and mass, as a complete sentence below:

Solution

Mathematical relationship between number of moles and masses:

n= m/M,

chemical amount of a substance is ratio of mass of substance to it's molar mass.

Mathematical relationship between number of molecules and mass:

$N = N_A \cdot n = N_A \cdot m/M$.

Number of molecules is ratio of multiplication of Avogadro number and mass to it's molar mass.

Answer: $n = m/M$,

$$N = N_A \cdot n = N_A \cdot m/M.$$