Problem 8 Three elements

Let A, B and C three elements and a, b and c their valence respectively.
Then:

%A in A_bB_a is 75 %:

$$\frac{b.A}{b.A+a.B}=0.75 \qquad bA = 3aB$$

%B in B_cC_b is 7.8 %:

$$\frac{c.B}{c.B+b.C}=0.078 \qquad 11.82cB = bC$$

%C in A_cC_a is?

$$\frac{a.C}{a.C+c.A}=\frac{a.C}{a.C+\frac{b.C}{11.82B}.A}=\frac{a.C}{a.C+\frac{3a.B.C}{11.82B}}=\frac{a.C}{1.254a.C}=0.7976=79.76$$

An element of the three elements is hydrogen for requirements of electroneutrality in the molecules.
Hydrogen is the element with minor percentage. Then B is hydrogen.
Now A = 3 a and C = 11.82 c
a, c = {1,2,3,4,5,6,7}
A = 3.4 = 12 then A: carbon
C = 11.82 · 4 = 47.28 then C: titanium
In conclusion A = C, B = H and C = Ti.
The three compounds are CH_4, TiH_4 and TiC.

Solution proposed by
Juan Medina - Master student PUCP - Pontifical Catholic University of Peru