1) Let $x = \text{fractional abundance of Ga-69}$ and $y = \text{fractional abundance of Ga-71}$. Then we know that:

$$68.92558x + 70.92470y = 69.723$$ (since the weighted average of the masses must equal the observed mass)

and

$$x + y = 1.00.$$ (Since the total abundance has to be 1.00 or 100%)

Solving this second equation for $x$, we get: $x = 1 - y$

Substituting into the first equation, we get:

$$68.92558(1 - y) + 70.92470y = 69.723$$

This yields: $1.99912y = 0.79742$ and $y = 0.399 = \text{fractional abundance of Ga-69}$ and $x = 0.601 = \text{fractional abundance of Ga-71}$.

2) This is a relatively easy problem. We are asked to mix equal amounts of naturally occurring chlorine and chlorine-35. That means the relative abundance of each mass type is 0.50 or 50%. So the average atomic mass we will observe in this mixture is:

$$0.50(35.4527) + 0.50(34.96885) = 17.72635 + 17.484425 = 35.210775 \text{ amu}$$

or, rounding to the correct number of significant digits, $35.2108$.

3) Copper (II) sulfate pentahydrate has the formula $\text{CuSO}_4\cdot5\text{H}_2\text{O}$; the monohydrate has formula $\text{CuSO}_4\cdot\text{H}_2\text{O}$ (needed later), and the anhydrous compound as the formula $\text{CuSO}_4$. For the second part, look at the following equation with the masses inserted:

$$\text{CuSO}_4\cdot5\text{H}_2\text{O} \rightarrow \text{CuSO}_4 + 5\text{H}_2\text{O}$$

3.548 g 2.268 g  (1.280 g) (obtained by conservation of mass)

This last datum implies that each water is “worth” 1.280 g/5 = 0.2560 g so if the CuSO$_4$ had not lost the last water molecule, the monohydrate CuSO$_4$·H$_2$O would mass 2.524 g.

4) From the density and volume of Cl$_2$ gas used, we can get the mass of Cl$_2$ as: 0.5925 L(2.948 g/L) = 1.747 g. For the second question, recall the Law of Constant Proportions, and note that we are told we obtain a metal chloride with formula XCl i.e. a 1:1 compound. We know that 5.315 g of X combine with 1.747 g of Cl$_2$; using proportions, we get:
\[
\frac{5.315 \text{g}X}{1.747 \text{gCl}} = \frac{Z \text{amu}X}{35.453 \text{amuCl}}
\]
solving for Z amu, we get: 188.4327 amu•g/1.747 g = 107.86 amu X, and X is Ag (silver).