

f 9.) How many water molecules are present in cobalt (II) chloride hexahydrate?

- (a) 1 (b) 2 (c) 3 (d) 4 (e) 5 (f) 6 (g) 7 (h) 8 (i) 9 (j) 10

d 10.) In the formula $\text{Cr}_2(\text{SO}_4)_3$, Chromium is a(n):

- (a) anion with a charge of 2 (b) cation with a charge of 2
(c) anion with a charge of 3 (d) cation with a charge of 3

SHORT ANSWER (10 pts each): Completely answer all of the following questions. Read all questions carefully!!! Show all work. Make sure to include units and report all mathematical answers to the correct number of significant figures. Write final answers in designated boxes or tables when they are provided.

1. A cube with sides measuring 2.53 m has a mass of 0.02713 g. What is the density of the cube in $\mu\text{g/mL}$? Report your answer in scientific notation to the correct number of significant figures.

Answer:

$1.68 \times 10^{-3} \mu\text{g/mL}$

2. Fill in the table with the atomic symbol, number of protons, number of electrons, and number of neutrons for each of the elements or ions indicated (the number listed next to the element is the mass number)

Element/ion	Symbol	Protons	Electrons	Neutrons
Chlorine-37	Cl	17	17	20
Chromium-53	Cr	24	24	29
Xenon-129	Xe	54	54	75
Strontium-86 ion	Sr	38	36	48
Fluorine-19 ion	F	9	10	10

3. Name the following ionic compounds:

- a.) NaF sodium fluoride
- b.) $\text{Ca}(\text{OH})_2$ calcium hydroxide
- c.) Cr_2S_3 chromium (III) sulfide

4. Name the following covalent compounds:

- a.) N_2O dinitrogen monoxide
- b.) CF_4 carbon tetrafluoride
- c.) P_2O_5 diphosphorus pentoxide

5. Write formulas for the following compounds:

- a.) Magnesium bromide MgBr_2
- b.) Tin (II) carbonate SnCO_3
- c.) Iron (II) phosphate $\text{Fe}_3(\text{PO}_4)_2$
- d.) Xenon hexafluoride XeF_6
- e.) Diarsenic pentoxide As_2O_5

6.) Determine the percent composition of copper (III) nitrate.

Answer:

25.463 % Cu
16.838 % N
57.699 % O

7. Calculate the following:

a.) The number of moles in 258.9 g of $\text{Ca}(\text{OH})_2$.

Answer:

3.494 mol

b.) The mass of 2.8×10^{-2} moles of Platinum.

Answer:

5.5 g

c.) The number of molecules in 28.3 g of carbon dioxide.

Answer:

3.87×10^{23} molecules

8. How many ions are present in 59.3 g of BaCl_2 ?

Answer:

5.14×10^{23} ions

1. (10 pts) For the following reaction: $2 \text{LiOH} + \text{CO}_2 \rightarrow \text{Li}_2\text{CO}_3 + \text{H}_2\text{O}$

If a reaction vessel contains 105.37g LiOH and 140.83g CO_2

Answer:

(a) Which compound is the limiting reagent?

(b) What is the theoretical yield?

(c) If the reaction produced 152.6 g, what is the percent yield?

(a) Limiting reagent = **LiOH**

(b) Theoretical yield = **162.55 g**

(c) % Yield = **93.88%**

5. (5 pts) Balance the following equations:

