Question 1 10 Points

Question 2 3 Points

Question 3 6 Points
a. Give the correct number of significant figures for each of the following:
0.08524 :
4
21.10: 4
b. Report the answer for the following operation to the correct number of significant figures:

$$
23.46-1.101=22.36
$$

c. When 58.6 is divided by $1.0 \times 10^{-2}$, the answer should be reported to $\qquad$ significant digits).
d. How many eggs are there in exactly 9 dozen?


Circle those of the following (if any) that have the same number of protons and electrons.
${ }^{1} \mathrm{H}^{+}$
${ }^{24} \mathrm{Mg}^{2+}$
${ }^{9} \mathrm{Be}$
${ }^{40} \mathrm{Ca}^{2+}$


A piece of copper has a volume of 0.5 L . How many atoms does the sample contain?
No need to do the calculation - just set up the correct dimensional analysis conversions you may not need to fill in all the boxes.

| $1 \mathrm{~cm}^{3} \mathrm{Cu}=8.8 \mathrm{~g} \mathrm{Cu}$ | $1 \mathrm{~kg}=1000 \mathrm{~g}$ | $1 \mathrm{~L}=1000 \mathrm{~cm}^{3}$ |
| :--- | :--- | :--- |
| $9.5 \times 10^{21}$ atoms $\mathrm{Cu}=1 \mathrm{~g} \mathrm{Cu}$ | $1 \mathrm{~cm}^{3}=1 \mathrm{~mL}$ |  |



Question 4 6 Points

Question 5 4 Points

How many protons, neutrons and electrons are there in ${ }^{7} \mathrm{Li}^{+}$

$$
\text { Protons: } 3 \quad \text { Neutrons: } 4 \quad \text { Electrons: } 2
$$

A certain element consists of two stable isotopes.
The first has an atomic mass of 121 amu and a percent natural abundance of $57.3 \%$.
The second has an atomic mass of 123 amu and a percent natural abundance of 42.7\% Show Work

$$
0.573(121)+0.427(123)=
$$

Question 6 10 Points

Question 7 2 Points

3 Points
Briefly justify your choice.

1. $\mathbf{C r}$ is in period $\qquad$
2. Element 64 is $a(n)$ Coulombic force of attraction?

Question 8 8 Points

Question 9 9 Points

Question 10 6 Points

Use the Periodic Table accompanying this exam to answer the following questions: and group $\qquad$ _.
2. The symbol for the lightest alkali metal.
4. Group VIIA are collectively known as the:


Assuming that the distance is approximately the same. Circle the salt that has the greatest

- Potassium chloride
- Magnesium oxide
- Calcium sulfide
- Aluminum phosphate

Give the correct name for each of the following ionic compounds.
a. $\mathrm{NH}_{4} \mathrm{OH}$ ammonium hydroxide
c. $\mathrm{Cu}\left(\mathrm{ClO}_{4}\right)_{2}$ COpper (11) perchbrate
b. FeN

d. $\mathrm{Ca}\left(\mathrm{HSO}_{4}\right)_{2}$ Calcium hydrogen sulfate

Give the correct formula for each of the following ionic compounds.
a. Iron(II) sulfite $\qquad$
b. Sodium phosphate

c. Calcium chlorate


Calculate the mass percent of bromine in carbon tetrabromide.
Show Work
$C \quad \mathrm{Br}$
$12.01+4(79.90)$
$12.01+319.6=331.61 \mathrm{~g} \cdot \mathrm{~mol}^{-1}$
$\mathrm{CBr}_{4}$
$12.01+319.6=331.61{\mathrm{~g} . \mathrm{mol}^{-1} \quad\left(\frac{319.6}{331.61}\right) 100=}^{2}=$

Question 11
8 Points

Question 12 6 Points

How many grams of oxygen are present in 1.59 moles of dioxygen difluoride? Show Work

\section*{| $1.59 \mathrm{~mol} \mathrm{O}_{2} \mathrm{~F}_{2}$ | 2 O |
| :--- | :--- |
| $1 \mathrm{O}_{2} \mathrm{~F}_{2}$ |  |$=3.18 \mathrm{~mol} \mathrm{O}$}

A compound is found to contain $30.45 \%$ nitrogen and $69.55 \%$ oxygen by weight and has a molar mass of $92.02 \mathrm{~g} / \mathrm{mol}$. What is the formula of this compound?
Show Work


Question 13 6 Points

Question 13 6 Points

Balance the following chemical equations using the smallest whole number integers possible.

1. $\qquad$ NO (g) $+2$

$$
H_{2}(g)=
$$

$\qquad$ $\mathrm{N}_{2}(\mathrm{~g})$

$$
+2 \mathrm{H}_{2} \mathrm{O}(\mathrm{I})
$$

2. Phosphoric acid $\left(\mathrm{H}_{3} \mathrm{PO}_{4}\right)+$ Potassium hydroxide $=$ Potassium phosphate + water

$$
\mathrm{H}_{3} \mathrm{PO}_{4}+3 \mathrm{KOH}=\mathrm{K}_{3} \mathrm{PO}_{4}+3 \mathrm{H}_{2} \mathrm{O}
$$

rays


Circle the correct answer to each of the following:
a. The one with the longest wavelength:
b. The one with the smallest frequency:
$X$ ray
Visible
IR
IR
c. The one with the greatest energy:
IR
AM
AM
$\gamma$ Rays
FM

Question 14 If your eyes receive a signal consisting of blue light, $\lambda=390 \mathrm{~nm}$. Determine the energy in 7 Points J. $\mathrm{mol}^{-1}$ of this light? Show Work

$$
\begin{aligned}
& 390 \mathrm{~nm} \left\lvert\, \frac{1 \times 10^{-9} \mathrm{~m}}{1 \mathrm{~nm}}=3.9 \times 10^{-7} \mathrm{~m}\right. \\
& \begin{array}{l}
\text { m } \\
\lambda r=c \\
3.9 \times 10^{-7}(\mathrm{v})=2.998 \times 10^{8} \mathrm{~m} . \mathrm{s}^{-1} \\
r=\frac{2.998 \times 10^{8} \mathrm{~m} \mathrm{~s}}{}{ }^{-1} \\
3.9 \times 10^{-7} \mathrm{~m}
\end{array} \\
& r=7.69 \times 10^{14} \mathrm{~s}^{-1}
\end{aligned}
$$

$$
\begin{aligned}
& E=h V \\
& E=6.626 \times 10^{-34} \mathrm{~J} \cdot \mathrm{~S}\left(7.69 \times 10^{14} \mathrm{~s}^{-1}\right) \\
& E=5.09 \times 10^{-19} \mathrm{~J} \\
& E=5.09 \times 10^{-19} \mathrm{~J}\left(6.023 \times 10^{23} \mathrm{~mol}^{-1}\right)
\end{aligned}
$$

$3.07 \times 10^{5} \mathrm{J.mol}^{-1}$

