Question 1
10 Points

1. How many **significant figures** are there in each of the following numbers?
   a. **0.0703** 3
   b. **241.9** 4
2. When **18.44** is added to **36.1**, the result should be reported with 1 digit(s) after the decimal point.
3. When **18.44** is multiplied by **36.1**, the answer should be reported to 3 significant digit(s).
4. There are **12** eggs in a dozen. If a farmer's chickens produce an average of **524** dozen eggs in a month, how should the average number of eggs per month be reported? 6.29×10^3

Question 2
3 Points

MAIN QUESTION

Question

Carry out the following calculation and report the answer in the correct number of significant figures.

$$(168)\left[\frac{23.56 - 2.3}{1.248 \times 10^3}\right] =$$

Answer

2.86

Question 3
8 Points

Give the correct name for the following polyatomic ion.

a. ClO_2^- **Chlorite**
b. SO_4^{2-} **Sulfate**
c. SO_3^{2-} **Sulfite**
d. NO_3^- **Nitrate**

Question 4
3 Points

QUESTION 2 OF 5

A nucleus has 19 protons and 20 neutrons. Fill in the three blanks to complete the atomic symbol.

ANSWER

$^{39}_{19}K$

Question 5
4 Points

Gallium has two naturally occurring isomers:

	Exact Mass (amu)	Abundance
^{69}Ga	69.925581	60.10
^{71}Ga	70.924701	39.90

What is the **average atomic mass** of Gallium? Give answer to **6 decimal places**.

69.925581(0.6010) + 70.924701(0.3990) = **70.324230 amu**

Average atomic mass: **70.324230 amu**

Question 6 (10 Points) The following questions pertain to the periodic table given at the front of this exam:

a. Element **22** belongs to which **group?** **IVB**

b. Element **22** belongs to which **period?** **4**

c. Element **22** is one of the **Transition metals.**

d. The **symbol** for the **lightest Alkali Earth Metal** is? **Be**

e. The **name** of the **diatomic element** in **period 3.** **Chlorine**

Question 7 (8 Points)

a. What is the **formula** for **magnesium sulfide?** **MgS**

b. **Name** of the compound with the formula **$CaCO_3$?** **Calcium carbonate**

c. What is the **formula** for **ammonium iodide?** **NH_4I**

d. **Name** of the compound with the formula **Cu_3PO_4?** **Copper(I) phosphate**

Question 8 (4 Points)

QUESTION

A sample of cinnamaldehyde, C_9H_8O, contains 0.168 mol of the compound. What is the mass of this sample, in grams?

ANSWER

22.2 g

Question 9 (6 Points) How many **moles** of **nitrate ions** are present in a sample that contains **2.88** moles of magnesium nitrate, **$Mg(NO_3)_2$?**
[Must Show Work]

$$\frac{2.88 \text{ mol } Mg(NO_3)_2}{1 \text{ } Mg(NO_3)_2} \left| \frac{2 \text{ } NO_3^-}{} \right. = 5.76 \text{ mol } NO_3^-$$

Moles of NO_3^- **5.76**

Question 10 (8 Points) How many **grams** of **Co^{2+}** are present in **1.59** moles of **$Co_3(PO_4)_2$?**
[Must Show Work]

$$\frac{1.59 \text{ mol } Co_3(PO_4)_2}{1 \text{ } Co_3(PO_4)_2} \left| \frac{3 \text{ } Co^{2+}}{} \right. = 4.77 \text{ mol } Co^{2+}$$

$$\frac{4.77 \text{ mol } Co^{2+}}{1 \text{ mol}} \left| \frac{58.39 \text{ g}}{} \right. = 281 \text{g } Co^{2+}$$

Grams of Co^{2+} **281g**

Question 11
6 Points

1. Balance the following molecular equations using the **smallest possible integer coefficients**.

   a. $P_2O_5(s) + 3\ H_2O(l) = 2\ H_3PO_4(aq)$

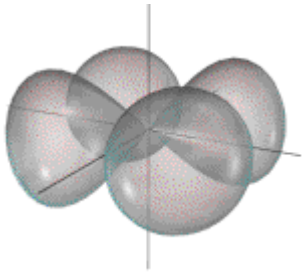
   b. $2\ C_2H_6(l) + 7\ O_2(g) = 4\ CO_2(g) + 6\ H_2O(l)$

2. Write a balanced equation for the reaction described, using the **smallest possible integer coefficients**.
   When **iron** reacts with **oxygen**, **iron(II) oxide** is formed.

   $2\ Fe(s) + O_2(g) = 2\ FeO$

Question 12
8 Points

1. How **many** orbitals are there in the shell with **n = 4** in an atom? **16**
2. The maximum number of electrons possible in a set of **4s orbitals** is? **2**
3. The orbital depicted directly below is what **type of orbital?** **d**



4. The **2s** orbital is **smaller/lower in energy/closer to the nucleus** than the **3s** orbital.

Question 13
14 Points

1. Write the **electron configuration** for the **chlorine** atom: $1s^2 2s^2 2p^6 3s^2 3p^5$.
2. Write the **electron configuration** for the **calcium** atom: $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$.
3. Write the **Noble Gas configuration** for **iron**: $[Ar] 4s^2 3d^6$.
4.  The Lewis diagram represents the **valence electron configuration** of a main-group element. This element is in **group**: **VIA**
5. The element with an electron configuration of $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$ is in **group** **VB** and **period** **4**.
6. **Carbon** has **4** **valence electrons**.

Question 14
4 Points

Rank the following elements, from 1-4 with 1 being the **smallest**, according to **atomic size**.

2 C **1** O **3** Be **4** Ca

Question 15
4 Points

Rank the following elements, from 1-4 with 1 being the **smallest**, according to **ionization energy**.

3 C **4** O **2** Be **1** Ca

Exam I Score