



Question 6  
10 Points

Use the Periodic Table accompanying this exam to answer the following questions:

1. Cr is in period 4 and group VIB.
2. The symbol for the lightest alkali metal. Li
3. Element 64 is a(n) Lanthanide
4. Group VIIA are collectively known as the: Halogens/Halides

Question 7  
2 Points

Assuming that the distance is approximately the same. Circle the salt that has the greatest Coulombic force of attraction?

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

3 Points

Briefly justify your choice.

With d the same, FA depends on the magnitude of the charges:  
 $Al^{3+}/PO_4^{3-} > Mg^{2+}/O^{2-}, Ca^{2+}/S^{2-} > K^+Cl^-$

Question 8  
8 Points

Give the correct name for each of the following ionic compounds.

- NH<sub>4</sub>OH Ammonium hydroxide
- FeN Iron(III) nitride
- Cu(ClO<sub>4</sub>)<sub>2</sub> Copper(II) perchlorate
- Ca(HSO<sub>4</sub>)<sub>2</sub> Calcium hydrogen sulfate

Question 9  
9 Points

Give the correct formula for each of the following ionic compounds.

- Iron(II) sulfite FeSO<sub>3</sub>
- Sodium phosphate Na<sub>3</sub>PO<sub>4</sub>
- Calcium chlorate Ca(ClO<sub>3</sub>)<sub>2</sub>

Question 10  
6 Points

Calculate the mass percent of bromine in carbon tetrabromide.

Show Work

$$\begin{array}{l} C \qquad \qquad Br \\ 12.01 + 4(79.90) \\ 12.01 + 319.6 = 331.61 \text{ g.mol}^{-1} \end{array}$$



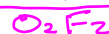
$$\left( \frac{319.6}{331.61} \right) 100 =$$

96.38 %

Question 11  
8 Points

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

Show Work



$$\frac{1.59 \text{ mol } O_2F_2}{1 \text{ } O_2F_2} \times \frac{2 \text{ O}}{1 \text{ } O_2F_2} = 3.18 \text{ mol O}$$

$$\frac{3.18 \text{ mol O}}{1 \text{ mol}} \times \frac{16.00 \text{ g}}{1 \text{ mol}} =$$

**50.9** g

Question 12  
6 Points

A compound is found to contain 30.45% nitrogen and 69.55% oxygen by weight and has a molar mass of 92.02 g/mol. What is the **formula** of this compound?

Show Work

N	O
30.45g	69.55g
2.173 mol	4.347 mol
$\frac{2.173 \text{ mol}}{2.173 \text{ mol}}$	$\frac{4.347 \text{ mol}}{2.173 \text{ mol}}$
1.000	2.000



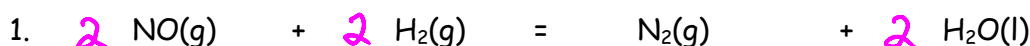
$$NO_2: 14.01 + 2(16.00) = 46.01 \text{ g} \cdot \text{mol}^{-1}$$

$$\frac{92.02 \text{ g} \cdot \text{mol}^{-1}}{46.01 \text{ g} \cdot \text{mol}^{-1}} = 2$$

**$N_2O_4$**

Question 13  
6 Points

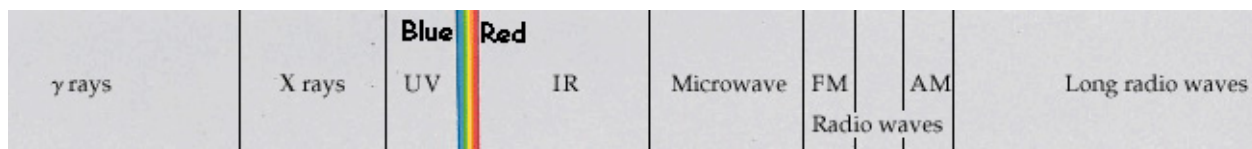
Balance the following chemical equations using the **smallest** whole number integers possible.



2. Phosphoric acid (H<sub>3</sub>PO<sub>4</sub>) + Potassium hydroxide = Potassium phosphate + water



Question 13  
6 Points



Circle the correct answer to each of the following:

a. The one with the longest wavelength:

X rays

IR

**AM**

b. The one with the smallest frequency:

**Visible**

UV

γ Rays

c. The one with the greatest energy:

**IR**

AM

FM

Question 14  
7 Points

If your eyes receive a signal consisting of blue light,  $\lambda = 390\text{nm}$ . Determine the energy in  $\text{J}\cdot\text{mol}^{-1}$  of this light?

Show Work

$$\frac{390\text{ nm} \left| \frac{1 \times 10^{-9}\text{ m}}{1\text{ nm}} \right.}{1\text{ nm}} = 3.9 \times 10^{-7}\text{ m}$$

$$\lambda \nu = c$$
$$3.9 \times 10^{-7}(\nu) = 2.998 \times 10^8\text{ m}\cdot\text{s}^{-1}$$

$$\nu = \frac{2.998 \times 10^8\text{ m}\cdot\text{s}^{-1}}{3.9 \times 10^{-7}\text{ m}}$$

$$\nu = 7.69 \times 10^{14}\text{ s}^{-1}$$

$$E = h\nu$$
$$E = 6.626 \times 10^{-34}\text{ J}\cdot\text{s} (7.69 \times 10^{14}\text{ s}^{-1})$$
$$E = 5.09 \times 10^{-19}\text{ J}$$

$$E = 5.09 \times 10^{-19}\text{ J} (6.023 \times 10^{23}\text{ mol}^{-1})$$

$$3.07 \times 10^5$$

$\text{J}\cdot\text{mol}^{-1}$

Do Not Write Below This

Exam I Score