

## The Periodic Table

<i>IA</i> <b>H</b> 1 1.01																	<i>VIIIA</i> <b>He</b> 2 4.00
<i>IIA</i> <b>Li</b> 3 6.94	<b>Be</b> 4 9.01											<i>IIIA</i> <b>B</b> 5 10.81	<i>IVA</i> <b>C</b> 6 12.01	<i>V A</i> <b>N</b> 7 14.01	<i>VIA</i> <b>O</b> 8 16.00	<i>VIIA</i> <b>F</b> 9 19.00	<b>Ne</b> 10 20.18
<b>Na</b> 11 22.99	<b>Mg</b> 12 24.31	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VII B</i>	<i>VIII B</i>	<i>VIII B</i>	<i>VIII B</i>	<i>IB</i>	<i>IIB</i>	<b>Al</b> 13 26.98	<b>Si</b> 14 28.09	<b>P</b> 15 30.97	<b>S</b> 16 32.07	<b>Cl</b> 17 35.45	<b>Ar</b> 18 39.95
<b>K</b> 19 39.10	<b>Ca</b> 20 40.08	<b>Sc</b> 21 44.96	<b>Ti</b> 22 47.88	<b>V</b> 23 50.94	<b>Cr</b> 24 52.00	<b>Mn</b> 25 54.94	<b>Fe</b> 26 55.85	<b>Co</b> 27 58.93	<b>Ni</b> 28 58.69	<b>Cu</b> 29 63.55	<b>Zn</b> 30 65.39	<b>Ga</b> 31 69.72	<b>Ge</b> 32 72.61	<b>As</b> 33 74.92	<b>Se</b> 34 78.96	<b>Br</b> 35 79.90	<b>Kr</b> 36 83.80
<b>Rb</b> 37 85.47	<b>Sr</b> 38 87.62	<b>Y</b> 39 88.91	<b>Zr</b> 40 91.22	<b>Nb</b> 41 92.91	<b>Mo</b> 42 95.94	<b>Tc</b> 43 (97.9)	<b>Ru</b> 44 101.07	<b>Rh</b> 45 102.91	<b>Pd</b> 46 106.42	<b>Ag</b> 47 107.87	<b>Cd</b> 48 112.41	<b>In</b> 49 114.82	<b>Sn</b> 50 118.71	<b>Sb</b> 51 121.76	<b>Te</b> 52 127.60	<b>I</b> 53 126.90	<b>Xe</b> 54 131.29
<b>Cs</b> 55 132.91	<b>Ba</b> 56 137.33	<b>La</b> 57 138.91	<b>Hf</b> 72 178.49	<b>Ta</b> 73 180.95	<b>W</b> 74 183.85	<b>Re</b> 75 186.21	<b>Os</b> 76 190.2	<b>Ir</b> 77 192.22	<b>Pt</b> 78 195.08	<b>Au</b> 79 197.97	<b>Hg</b> 80 200.59	<b>Tl</b> 81 204.38	<b>Pb</b> 82 207.2	<b>Bi</b> 83 208.98	<b>Po</b> 84 (209)	<b>At</b> 85 (210)	<b>Rn</b> 86 (222)
<b>Fr</b> 87 223.02	<b>Ra</b> 88 226.03	<b>Ac</b> 89 227.03	<b>Rf</b> 104 (261)	<b>Db</b> 105 (262)	<b>Sg</b> 106 263)	<b>Bh</b> 107 (262)	<b>Hs</b> 108 (265)	<b>Mt</b> 109 (266)	<b>Ds</b> 110 (271)	<b>Rg</b> 111 (272)	<b>Uub</b> 112 (285)	<b>Uut</b> 113 (284)	<b>Uuq</b> 114 (289)	<b>Uup</b> 115 (288)			
<b>Ce</b> 58 140.12	<b>Pr</b> 59 140.91	<b>Nd</b> 60 144.24	<b>Pm</b> 61 (145)	<b>Sm</b> 62 150.36	<b>Eu</b> 63 152.97	<b>Gd</b> 64 157.25	<b>Tb</b> 65 158.93	<b>Dy</b> 66 162.50	<b>Ho</b> 67 164.93	<b>Er</b> 68 167.26	<b>Tm</b> 69 168.93	<b>Yb</b> 70 173.04	<b>Lu</b> 71 174.97				
<b>Th</b> 90 232.04	<b>Pa</b> 91 231.04	<b>U</b> 92 238.03	<b>Np</b> 93 237.05	<b>Pu</b> 94 (240)	<b>Am</b> 95 243.06	<b>Cm</b> 96 (247)	<b>Bk</b> 97 (248)	<b>Cf</b> 98 (251)	<b>Es</b> 99 252.08	<b>Fm</b> 100 257.10	<b>Md</b> 101 (257)	<b>No</b> 102 259.10	<b>Lr</b> 103 262.11				

## Some Formula and Constants:

$$\begin{aligned}
 c &= 2.998 \times 10^8 \text{ m} \cdot \text{s}^{-1} \\
 h &= 6.626 \times 10^{-34} \text{ J} \cdot \text{s} \\
 N &= 6.023 \times 10^{23} \text{ mol}^{-1} \\
 1 \text{ nm} &= 1 \times 10^{-9} \text{ m}
 \end{aligned}$$



SID 

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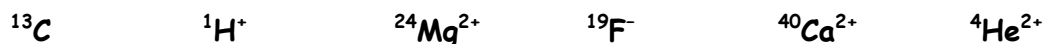
Last \_\_\_\_\_ First \_\_\_\_\_

**Question 1**  
10 Points

- a. Give the **correct** number of **significant figures** for each of the following:  
0.038 : \_\_\_\_\_ 611.0 : \_\_\_\_\_
- b. Report the answer for the following operation to the **correct number of significant figures**:  
23.46 + 1.106 = \_\_\_\_\_
- c. When **58.6** is divided by  $1.90 \times 10^{-2}$ , the answer should be reported to \_\_\_\_\_ **significant digit(s)**.
- d. Reported to the correct number of significant figures, how many **hours** are there in **exactly 13 days**? \_\_\_\_\_
- e. Write the following number in non-exponential notation.  $4.94 \times 10^4$  \_\_\_\_\_

**Question 2**  
6 Points

**Circle** those of the following (if any) that have the **same number of neutrons and electrons**.



**Question 3**  
6 Points

A piece of copper contains  $1 \times 10^7$  atoms of copper. What is its **volume** in L?

**No need to do the calculation** - just set up the correct dimensional analysis conversions - **you may not need to fill in all the boxes.**

$1 \text{ cm}^3 \text{ Cu} = 8.8 \text{ g Cu}$	$1 \text{ kg} = 1000 \text{ g}$	$1 \text{ L} = 1000 \text{ cm}^3$
$9.5 \times 10^{21} \text{ atoms Cu} = 1 \text{ g Cu}$		$1 \text{ cm}^3 = 1 \text{ mL}$

$1.0 \times 10^7$  atoms x \_\_\_\_\_ x \_\_\_\_\_ x \_\_\_\_\_

**Question 4**  
6 Points

How many protons, neutrons and electrons are there in  $^{63}_{29}\text{Cu}^{2+}$

Protons: \_\_\_\_\_ Neutrons: \_\_\_\_\_ Electrons: \_\_\_\_\_

**Question 5**  
10 Points

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

1. **Mn** is in **period** \_\_\_\_\_ and **group** \_\_\_\_\_.
2. The **symbol** for the lightest **alkaline metal**. \_\_\_\_\_
3. Element **102** is a(n) \_\_\_\_\_
4. Group **VIIIA** are collectively **known** as the: \_\_\_\_\_
5. The **symbol** of the **heaviest period 4 transition metal**: \_\_\_\_\_

Question 6  
4 Points

The element copper has an atomic weight of **63.5 amu** and consists of two stable isotopes **copper-63** and **copper-65**.

- The isotope **copper-63** has an atomic mass of **62.9 amu** and a percent natural abundance of **69.1%**.
- The isotope **copper-65** has a percent natural abundance of **30.9%**.

What is the atomic mass of **copper-65**?

Show Work

amu

Question 7  
2 Points

It is a general trend that as **one goes down a group** the **atomic radius** (*distance from nucleus to outermost electron*) increases. From the list below circle the salt that you would predict to have the **weakest columbic force of attraction**?

- NaCl
- KBr
- RbI
- LiF

2 Points

Briefly justify your choice.

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Question 8  
8 Points

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

- a.  $\text{Na}_2\text{S}$  \_\_\_\_\_ c.  $\text{Al}_2(\text{SO}_4)_3$  \_\_\_\_\_  
b.  $\text{CrSO}_3$  \_\_\_\_\_ d.  $\text{MgCrO}_4$  \_\_\_\_\_

Question 9  
8 Points

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

- a. Calcium hydroxide \_\_\_\_\_  
b. Magnesium oxide \_\_\_\_\_  
c. Iron(II) perchlorate \_\_\_\_\_  
d. Ammonium phosphate \_\_\_\_\_

Question 10  
4 Points

Calculate the **percent by weight** of carbon in  $\text{CH}_4\text{O}$ .

Show Work

%

Question 11  
4 Points

How many **atoms** of xenon are present in **4.44** moles of **xenon trioxide**?

Show Work

atoms

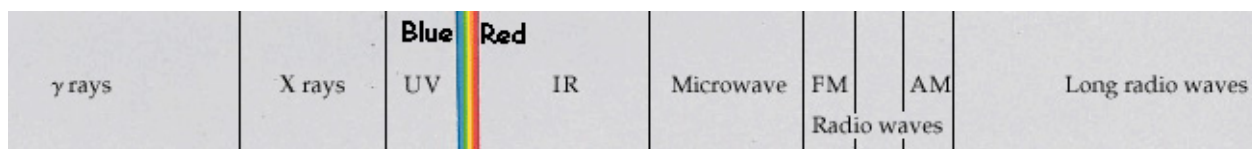
Question 12  
4 Points

How many **moles** of carbon are present in  $5.17 \times 10^{22}$  molecules of  $\text{C}_2\text{H}_5$ ?

Show Work

moles

Question 13  
6 Points



Circle the **correct answer** to each of the following:

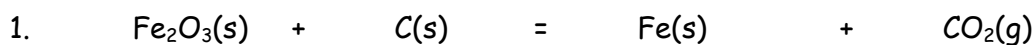
- a. The **one** with the **shortest wavelength**:      X rays      IR      AM
- b. The **one** with the **smallest frequency**:      X rays      UV       $\gamma$  Rays
- c. The **one** with the **greatest energy**:      FM      AM      Long radio waves

Question 14  
6 Points

A compound is found to contain **46.68% nitrogen** and **53.32% oxygen** by weight and has a molar mass of **60.02 g/mol**. What is the **formula** of this compound? Show Work

Question 15  
6 Points

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



Question 16  
8 Points

If your eyes receive a signal consisting of yellow light corresponding to an energy of **2.13×10<sup>5</sup> J.mol<sup>-1</sup>**. Determine the **wavelength** of this light in **nm**? Show Work

nm

*Do Not Write Below This*

Exam I Score