| iA | $1 / 1 / A$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | V/IIA |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\begin{gathered} \mathrm{H} \\ 1 \end{gathered}$ |  | The Periodic Table |  |  |  |  |  |  |  |  |  |  |  |  |  |  | He 2 |
| 1.01 |  |  |  |  |  |  |  |  |  |  |  | Mi/ | IVA | VA | V/A | V/IA | 4.00 |
| $\underset{3}{\mathrm{Li}}$ | Be 4 |  |  |  |  |  |  |  |  |  |  | B 5 | C | N 7 | 0 <br> 8 | F | Ne 10 |
| 6.94 | 9.01 |  |  |  |  |  |  |  |  |  |  | 10.81 | 12.01 | 14.01 | 16.00 | 19.00 | 20.18 |
| $\begin{gathered} \mathrm{Na} \\ 11 \end{gathered}$ | $\begin{gathered} \mathrm{Mg} \\ 12 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  | AI 13 | Si 14 | P | S | Cl 17 |  |
| 22.99 | 24.31 | $\ldots$ | IVB | VB | V/B | V/IIS | V/igs | V/INB | V/IM | 18 | $1 / 8$ | 26.98 | 28.09 | 30.97 | 32.07 | 35.45 | 39.95 |
| K | Ca | Sc | Ti | V | Cr | Mn | Fe | Co | Ni | Cu | Zn | Ga | Ge | As | Se | Br | Kr |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 39.10 | 40.08 | 44.96 | 47.88 | 50.94 | 52.00 | 54.94 | 55.85 | 58.93 | 58.69 | 63.55 | 65.39 | 69.72 | 72.61 | 74.92 | 78.96 | 79.90 | 83.80 |
| Rb | Sr | Y | Zr | Nb | Mo | Tc | Ru | Rh | Pd | Ag | Cd | In | Sn | Sb | Te | I | Xe |
| 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 |
| 85.47 | 87.62 | 88.91 | 91.22 | 92.91 | 95.94 | (97.9) | 101.07 | 102.91 | 106.42 | 107.87 | 112.41 | 114.82 | 118.71 | 121.76 | 127.60 | 126.90 | 131.29 |
| Cs | Ba | La | Hf | Ta | W | Re | Os | Ir | Pt | Au | Hg | TI | Pb | Bi | Po | At | Rn |
| 55 | 56 | 57 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 |
| 132.91 | 137.33 | 138.91 | 178.49 | 180.95 | 183.85 | 186.21 | 190.2 | 192.22 | 195.08 | 197.97 | 200.59 | 204.38 | 207.2 | 208.98 | (209) | (210) | (222) |
| Fr | Ra | Ac | Rf | Db | Sg | Bh | Hs | Mt | Ds | Rg | Uub | Uut | Uuq | Uup |  |  |  |
| 87 | 88 | 89 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 |  |  |  |
| 223.02 | 226.03 | 227.03 | (261) | (262) | 263) | (262) | (265) | (266) | (271) | (272) | (285) | (284) | (289) | (288) |  |  |  |


| Ce | Pr | Nd | Pm | Sm | Eu | Gd | Tb | Dy | Ho | Er | Tm | Yb | Lu |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 |
| 140.12 | $\mathbf{1 4 0 . 9 1}$ | $\mathbf{1 4 4 . 2 4}$ | $(145)$ | $\mathbf{1 5 0 . 3 6}$ | 152.97 | 157.25 | $\mathbf{1 5 8 . 9 3}$ | 162.50 | 164.93 | $\mathbf{1 6 7 . 2 6}$ | 168.93 | $\mathbf{1 7 3 . 0 4}$ | 174.97 |
| Th | Pa | U | Np | Pu | Am | Cm | Bk | Cf | Es | Fm | Md | No | Lr |
| 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | $\mathbf{1 0 2}$ | $\mathbf{1 0 3}$ |
| 232.04 | 231.04 | 238.03 | 237.05 | $(240)$ | 243.06 | $(247)$ | $(248)$ | $(251)$ | 252.08 | 257.10 | $(257)$ | 259.10 | 262.11 |


$\square$
$\qquad$

Question 1 6 Points

How many significant figures are there in each of the following numbers?
a. 57.44
4
c. $3.40 \times 10^{3}$
3
b. 0.065
2

Question 2
6 Points
a. When 36.456 is added to 74.2 , the result should be reported to how many decimal places? $\quad 1$
b. The number 26.71560... rounded to $\mathbf{4}$ significant figures is: 25.72
c. Reported to the correct number of significant figures, how many hours are there in exactly 24 days? 576 Both numbers are exact.

Question 3 A chemist needs 2.19 g of a liquid compound with a density of $0.921 \mathrm{~g} . \mathrm{cm}^{-3}$. What volume 5 Points of the compound is required?

Show work.

$$
\begin{array}{l|l}
2.19 \mathrm{~g} & 1 \mathrm{~cm}^{3} \\
\hline & 0.921 \mathrm{~g}
\end{array}=2.38 \mathrm{~cm}^{3}
$$

$$
2.38 \mathrm{~cm}^{3}
$$

Question 4 Give the correct name for the following polyatomic ions:
8 Points
a. $\mathrm{Cr}_{2} \mathrm{O}_{7}{ }^{2-} \quad$ Dichromate
b. $\mathrm{CN}^{-} \quad$ Cyanide
c. $\mathrm{ClO}_{4}^{-} \quad$ Perchlorate
d. $\mathrm{CrO}_{4}{ }^{2-} \quad$ Chromate

Question 5 How many protons, neutrons and electrons are there in ${ }^{18} \mathrm{O}^{2-}$ ?

6 Points
8 Protons
10 Neutrons
10 Electrons

Question 6 The following questions pertain to the periodic table given at the front of this exam: 8 Points
a. The symbol for the noble gas in period 4?
b. The symbol for the group VB, period 5 element?
c. The symbol for the lightest alkali earth metal is? Be
d. Group VIIA are collective known as:

Question 7 1. Name the compound with the formula $\mathrm{Al}_{2}\left(\mathrm{SO}_{3}\right)_{3}$ ? Aluminum sulfite 8 Points
2. Name the compound with the formula $\mathrm{Cu}\left(\mathrm{NO}_{3}\right)_{2}$ ? Copper(II) nitrate
3. What is the formula for magnesium nitride? $\quad \mathrm{Mg}_{3} \mathrm{~N}_{2}$
4. What is the formula for iron(II) hydroxide? $\mathrm{Fe}(\mathrm{OH})_{2}$

Question 8 5 Points

A certain element consists of two stable isotopes:

|  | Exact Mass (amu) | Abundance (\%) |
| :---: | :---: | :---: |
| $\# 1$ | 112.9043 | 4.28 |
| $\# 2$ | 114.9041 | 95.72 |

What is the average atomic mass of this element? Give answer to 4 decimal places Show Work

## $112.9043(0.0428)+114.9041(0.9572)$

114.8185 amu

Question 9 How many MOLES of chlorine are present in 4.05 grams of carbon tetrachloride? 6 Points

Show Work

$$
C C l_{4}: C+4(C I)=12.01+4(35.45)=153.81 \mathrm{~g}
$$

| 4.05 g | 1 mol |
| :--- | :--- |
|  | 153.81 g |$=0.0263 \mathrm{~mol}$


| 0.0263 mol | 4 Cl |
| :--- | :--- |
|  | $1 \mathrm{CCl}_{4}$ |$=0.105 \mathrm{~mol}$

0.105 moles

Question 10 How many GRAMS of I- are present in 2.03 moles of copper(II) iodide?
5 Points

| $2.03 \mathrm{~mol} \mathrm{CuI}_{2}$ | $2 \mathrm{I}^{-}$ |
| :--- | :--- |
|  | $1 \mathrm{CuCl}_{2}$ |$=4.06 \mathrm{~mol} \mathrm{I}^{-}: \quad$| $4.06 \mathrm{~mol} \mathrm{I}^{-}$ |
| :--- |
| 126.9 g |$=515 \mathrm{~g}$

515 grams

Question 11 Balance the following chemical equations using the smallest possible integer coefficients. 9 Points
a. $2 \mathrm{H}_{2} \mathrm{~S}(\mathrm{aq})+3 \mathrm{O}_{2}(\mathrm{~g}) \rightarrow 2 \mathrm{H}_{2} \mathrm{O}(\mathrm{l})+2 \mathrm{SO}_{2}(\mathrm{~g})$
b. Write a balanced equation for the complete oxidation reaction that occurs when ethane $\left(\mathrm{C}_{2} \mathrm{H}_{6}\right)$ burns in air.
$2 \mathrm{C}_{2} \mathrm{H}_{6}+7 \mathrm{O}_{2}=4 \mathrm{CO}_{2}+6 \mathrm{H}_{2} \mathrm{O}$
c. When sulfur dioxide reacts with oxygen, sulfur trioxide is formed.
$2 \mathrm{SO}_{2}+\mathrm{O}_{2}=2 \mathrm{SO}_{3}$

Question 12 Label the following orbital drawings as s, p, d or f.
6 Points


Question 13
4 Points


The orbital depicted on the left is not:
(Circle those that apply)

Question 14 1. Write the complete electronic configuration for phosphorus? $1 s^{2} 2 s^{2} 2 p^{6} 3 s^{2} 3 p^{3}$ 10 Points
2. Write the noble gas configuration for vanadium, (V)?
3. The element with an electron configuration of $1 s^{2} 2 s^{2} 2 p^{6} 3 s^{2} 3 p^{6} 4 s^{2} 3 d^{5} \quad M n$
4. Se, $[\mathrm{Ar}] 4 \mathrm{~s}^{2} 3 \mathrm{~d}^{10} 4 \mathrm{p}^{4}$, has how many valence electrons?
5. The element in period 4 that has the Lewis diagram, ${ }_{\bullet}$ :

Question 15 Using only the periodic table arrange the following elements in order of increasing atomic
4 Points radius: $\quad \mathrm{Mg}, \mathrm{O}, \mathrm{Na}, \mathrm{K}$
$\frac{O}{\text { Smallest }}$
$\qquad$ $\xrightarrow{\mathrm{Na}}$
$\frac{K}{\text { Largest }}$

Question 16 Using only the periodic table arrange the following elements in order of increasing 4 Points electronegativity: Ga, N, AI, P


