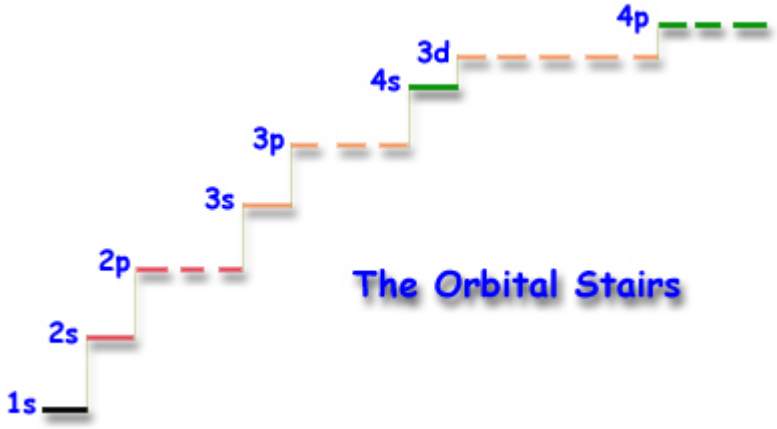
The Periodic Table

IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIIIB	VIIIB	VIIIB	IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA
H 1 1.01																	He 2 4.00
Li 3 6.94	Be 4 9.01											B 5 10.81	C 6 12.01	N 7 14.01	O 8 16.00	F 9 19.00	Ne 10 20.18
Na 11 22.99	Mg 12 24.31											Al 13 26.98	Si 14 28.09	P 15 30.97	S 16 32.07	Cl 17 35.45	Ar 18 39.95
K 19 39.10	Ca 20 40.08	Sc 21 44.96	Ti 22 47.88	V 23 50.94	Cr 24 52.00	Mn 25 54.94	Fe 26 55.85	Co 27 58.93	Ni 28 58.69	Cu 29 63.55	Zn 30 65.39	Ga 31 69.72	Ge 32 72.61	As 33 74.92	Se 34 78.96	Br 35 79.90	Kr 36 83.80
Rb 37 85.47	Sr 38 87.62	Y 39 88.91	Zr 40 91.22	Nb 41 92.91	Mo 42 95.94	Tc 43 (97.9)	Ru 44 101.07	Rh 45 102.91	Pd 46 106.42	Ag 47 107.87	Cd 48 112.41	In 49 114.82	Sn 50 118.71	Sb 51 121.76	Te 52 127.60	I 53 126.90	Xe 54 131.29
Cs 55 132.91	Ba 56 137.33	La 57 138.91	Hf 72 178.49	Ta 73 180.95	W 74 183.85	Re 75 186.21	Os 76 190.2	Ir 77 192.22	Pt 78 195.08	Au 79 197.97	Hg 80 200.59	Tl 81 204.38	Pb 82 207.2	Bi 83 208.98	Po 84 (209)	At 85 (210)	Rn 86 (222)
Fr 87 223.02	Ra 88 226.03	Ac 89 227.03	Rf 104 (261)	Db 105 (262)	Sg 106 263)	Bh 107 (262)	Hs 108 (265)	Mt 109 (266)	Ds 110 (271)	Rg 111 (272)	Uub 112 (285)	Uut 113 (284)	Uuq 114 (289)	Uup 115 (288)			

Ce 58 140.12	Pr 59 140.91	Nd 60 144.24	Pm 61 (145)	Sm 62 150.36	Eu 63 152.97	Gd 64 157.25	Tb 65 158.93	Dy 66 162.50	Ho 67 164.93	Er 68 167.26	Tm 69 168.93	Yb 70 173.04	Lu 71 174.97
Th 90 232.04	Pa 91 231.04	U 92 238.03	Np 93 237.05	Pu 94 (240)	Am 95 243.06	Cm 96 (247)	Bk 97 (248)	Cf 98 (251)	Es 99 252.08	Fm 100 257.10	Md 101 (257)	No 102 259.10	Lr 103 262.11



Some Useful (maybe) Constants:

a) 1 amu = 1.661×10^{-24} g

SID | | | | | | | | | Last _____ First _____

Question 1 (6 Points) Report the follow operations to the **correct** number of **significant figures**?

a) 36.456 + 74.2 _____

b) 18.4 x (1.000×10^{-3}) _____

c) 2.01(23.56-2.3) _____

Question 2 (4 Points) A piece of **copper** has a volume of **740L**. What is the mass of the same in **units of grams**.

1 cm^3 Cu = 8.8 g Cu	1 kg = 1000 g	1 L = 1000 cm^3
9.5×10^{21} atoms Cu = 1 g Cu		1 cm^3 = 1 mL

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

$$740\ L \times \frac{\quad}{\quad} \times \frac{\quad}{\quad} \times \frac{\quad}{\quad}$$

Question 3 (10 Points) Give the correct **formula** for the following **polyatomic ions**:

a) **Phosphide** _____

b) **Phosphate** _____

c) **Sulfite** _____

d) **Chromate** _____

e) **Cyanide** _____

Question 4 (4 Points) Which of the following apply to the **electron**?

- ☐ mass ~ 9.109×10^{-28} g
- ☐ charge = -1
- ☐ charge = 0
- ☐ charge = +1
- ☐ mass ~ 1.673×10^{-24} g

Question 5 (8 Points)

a) How many **protons** and **neutrons** are there in the nucleus of an atom that has an **atomic number of 83** and a **mass number of 214**?

Protons: _____

Neutrons: _____

b) What is the **symbol** for the **element**? **Symbol**: _____

c) The atom bears a charge of **+3**, then number of **electrons** is: _____

Question 6
8 Points

The following questions pertain to the **periodic table** given at the **front of this exam**:

a. The **atomic weight** of the element in **group 6A** and **period 3**? _____

b. What is the **name** of the **halogen** that is in **period 3**? _____

c. The **symbol** for the **lightest alkali metal** is? _____

d. **Circle** any of the following that are **main group elements**? (Z = atomic number)

Sc (Z=21) **Te** (Z=52) **V** (Z=23) **Cs** (Z=55)

Question 7
10 Points

a. **Name** the compound with the formula **$Ca(NO_2)_2$**? _____

b. **Name** the compound with the formula **$Cu(ClO_4)_2$**? _____

c. What is the **formula** for **sodium phosphide**? _____

d. What is the **formula** for **iron(III) sulfate**? _____

e. What is the **formula** for **ammonium hydroxide**? _____

Question 8
4 Points

A certain element consists of two stable isotopes:

	Exact Mass (amu)	Abundance (%)
#1	106.9051	51.82
#2	108.9047	48.18

What is the atomic weight of this element? **Give answer to 4 decimal places.**

Show Work

_____ **amu**

Question 9
4 Points

How many **moles** of boron trifluoride, **BF_3**, are present in a sample that contains **7.95 moles** of **fluorine atoms**?

Show Work

_____ **moles**

Question 10 How many **moles** of **copper(II) hydroxide** are present in **4.44 grams** of this compound?
6 Points **Show Work**

_____ **moles**

Question 11 Balance the following chemical equations using the **smallest possible integer coefficients**.
6 Points

a. __ HCl (aq) + __O_2(g) → __ H_2O (l) + __Cl_2 (g)

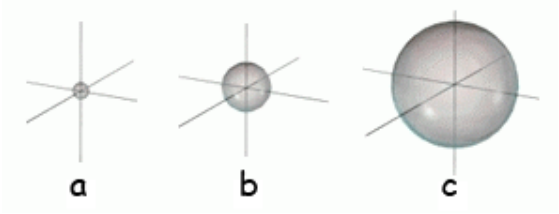
b. Write a **balanced equation** for the **complete oxidation** reaction that occurs when ethanol (**C_2H_5OH**) burns in air.

__ C_2H_5OH + __ _____ → __ _____ + __ _____

c. Write a **balanced equation** for the reaction of **nitrogen gas** with **hydrogen gas** to produce **ammonia** (**NH_3**)

__ _____(g) + __ _____(g) → __ NH_3(g)

Question 12
6 Points



a) The **orbitals** depicted above are **what type?** _____

b) Which orbital would have the **highest ionization energy?** _____

c) Which orbital would possess the **smallest force of attraction?** _____

Question 13
4 Points

a) **How many 4d** orbitals are there in an atom? _____

b) What is the **maximum** number of electrons in a set of **3p** orbitals? _____

Question 14
12 Points

a) Write the electron configuration for the **magnesium** atom. _____

b) Write the **noble gas** configuration for **iron,** (Fe)? _____

c) The **element** with an **electron configuration** of **$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^{10}$** _____

d) **Xe, $[Kr]5s^2 4d^{10} 5p^6$**, has how many **valence electrons?** _____

e) The **element** in **period 4** that has the **Lewis diagram,**  _____

f) **X** is a **Main Group** element in **period 3** with **4** valence electrons. X is: ___

Question 15 **4 Points** Using only the periodic table **arrange** the following elements in order of **increasing atomic** radius: **Na, N, K, P**

_____	_____	_____	_____
Smallest			**Largest**

Question 16 **4 Points** Using only the periodic table **arrange** the following elements in order of **decreasing ionization energy**: **As, Cl, Ge, P**

_____	_____	_____	_____
Highest			**Lowest**

Exam I Score