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 Formula and Constants:

c	=	2.998×10^{8} m.s^{-1}
h	=	6.626×10^{-34} J.s
N	=	6.023×10^{23} mol^{-1}
1 nm	=	1×10^{-9} m

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

Question 1
4 Points

When the following calculation is carried out the answer should be reported to how many **significant figures**?

$$(168)\left[\frac{11.564 - 11.32}{1.248 \times 10^{3}}\right]$$

Significant Figures [ ]

Question 2
6 Points

A nucleus has **78** protons and **117** neutrons. Fill in the blanks to complete the atomic symbol.

[ ]
[ ]
[ ]

Question 3
4 Points

Lithium has two naturally occurring isotopes:

	Mass (amu)	**Abundance**
$^{6}_{3}Li$	6.015	7.42%
$^{7}_{3}Li$	7.016	92.58%

What is the average atomic mass of Lithium? (**Give your answer to 3 decimal places**)

[ ] **amu**

Question 4
12 Points

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

1. **Formula** for the only **diatomic** in **Period 5** _____
2. **Symbol** for the **heaviest Alkali Earth** element. _____
3. **Symbol** for **transition metal** in **Group VIB**, **Period 6**. _____
4. Group **IIIA** Metals like to have this **charge**. _____
5. **Uranium** (U) is a: (**metal**, **nonmetal**, **metalloid**) _____
6. Group **VIIA** are collectively **known** as the: _____

Question 5
5 Points

Assuming that the **distance** between the atoms are approximately **the same** which of the following ionic compounds would you expect to have the **strongest** force of attraction: (**Circle your choice**)

a) Sodium chloride b) Magnesium sulfide c) Aluminum phosphide

Briefly justify your **choice**:

_____

_____

Question 6
8 Points

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

1. CuS _____
2. $Ca(CO_3)_2$ _____
3. Na_3P _____
4. $Fe_3(PO_4)_2$ _____

Question 7
8 Points

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

1. Ammonium hydroxide _____
2. Iron(II) sulfate _____
3. Potassium chlorate _____
4. Aluminum chromate _____

Question 8
8 Points

Morphine, $\mathbf{C_{17}H_{19}O_3N}$

A. **0.25** mol of Morphine **weighs** how many **grams**?

grams

B. How many **grams** of **Carbon** is there in **0.25** mol of Morphine?

grams

Question 9
4 Points

What is the **mass percent** of **N** in $\mathbf{N_2O_5}$

%

Question 10
6 Points

Butyric acid is composed of **carbon** (**54.52%**), **hydrogen** (**9.15%**) and oxygen (**36.31%**). Its molar mass is **88.11** g/mol. Determine the **molecular formula** of the compound.

Question 11
9 Points

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

1. ____ $H_2(g)$ + ____ $Cl_2(g)$ = ____ $HCl(g)$
2. ____ $C_2H_6(g)$ + ____ $O_2(g)$ = ____ $H_2O(l)$ + ____ $CO_2(g)$
3. ____ $KOH(aq)$ + ____ $H_3PO_4(aq)$ = ____ $K_3PO_4(aq)$ + ____ $H_2O(l)$

Question 12
6 Points

In the visible region of the electromagnetic spectrum, **red** and **blue** light lie at the extremes. Which of these has:

1. The **longest** wavelength: _____
2. The **least** energy: _____
3. The **smallest** frequency: _____

Question 13
4 Points

What is the **frequency** of ultraviolet light with a wavelength of **291** nm?

_____ **Hz**

Question 14
6 Points

A chemical reaction can be initiated by light that carries energy of **2.44×10^5** $J.mol^{-1}$.
Only light less than a certain wavelength will initiate the reaction.
What is the longest **wavelength**, in **meters**, that can deliver the required energy?
[Show All Work]

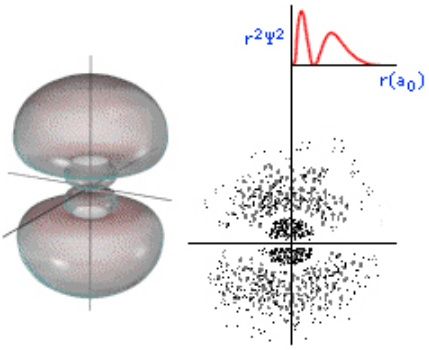
_____ **m**

Question 15
10 Points

1. How many orbitals are there with an **n** value equal to 3? _____
2. How many **nodal** surfaces are associated with a **3p** orbital? _____

The orbital depicted on the left is:

4. What **type** of orbital? _____
5. Its **n** value is? _____
6. What is the **smallest n** value for this type of orbital? _____



Do Not Write Below This

Exam I Score