UNIT 1

QUANTUM MECHANICS

ANSWERS

Quantum Theory Challenge
ANSWERS

Your Job: To create a "new" periodic table of the elements for the first 116 elements that would result from the following allowed values of the "new" set of quantum numbers.

"New" Allowable Quantum Numbers:

$n = 1$ to infinity

$l = 0$ to n (changed from 0 to n-1 → this is the only change.)

$m_l = -l$ to $+l$

$m_s = + ½$ and $- ½$

In constructing your periodic table you are to assume that "all other factors remain equal". ie) the diagonal filling pattern of sublevels etc. would be the same as the regular universe. This would probably not be the case but it simplifies the task.

Now that you know what the periodic table would look like in this new universe answer the following questions.

1.	Most reactive non-metal	N
2.	Two major components of air	B&C
3.	Element that would form the basis of life	Be
4.	Highest oxidation state of aluminum	+5
5.	Element that would build strong bones	Ar or Kr
6.	People with high blood pressure should avoid this	ClP
7.	Most reactive alkali metal	At
8.	Charge on a CH ion	-1
9.	Elements at the beginning and end of period 6	At & 116
10.	Element that is the major component of steel	Cr
11.	Most reactive metal	At
12.	Smallest Halogen	N
13.	Element used in the Goodyear blimp	O
14.	Would the blimp still fly?	yes
15.	All the diatomic elements	H N C B P AS Sb
16.	Common oxidation states of gold	+1, +3
17.	Formula of Argon aluminide	Ar_3Al_2
18	Most electronegative element	N
19.	The "new" gold	Ir
20.	The two elements in the first period that have lower ionization energy than the element that directly precedes them.	Li, C

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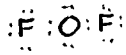
The "NEW" Periodic Table
Quantum Theory Challenge

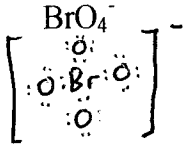
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
H	He																									Li	Be	B	C	N	O
F	Ne																									Na	Mg	Al	Si	P	S
Cl	Ar															K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se
Br	Kr															Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te
I	Xe	Cs	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po
At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	Rf	Ha	106	107	108	109	110	111	112	113	114	115	116

Rules for Drawing Lewis Structures

OF_2



BrO_4^-



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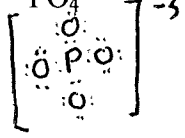
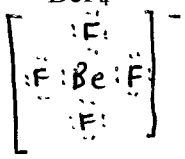
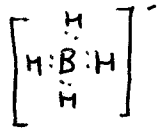


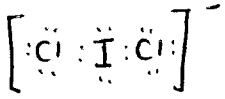
BeF_4^-



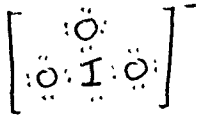
BH_4^-



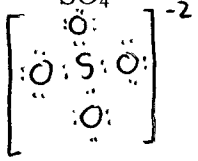
ICl_2^-



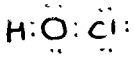
IO_3^-



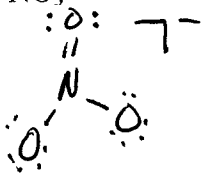
SO_4^{-2}



HOCl

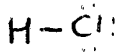


NO_3^-

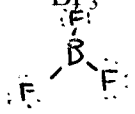


VSEPR Theory
Rules for Finding Lone Pairs of Electrons

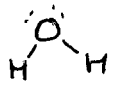
HCl



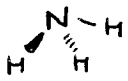
BF_3



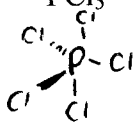
H_2O



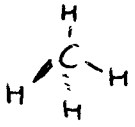
NH_3



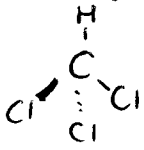
PCl_5



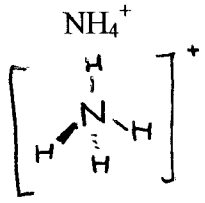
CH_4



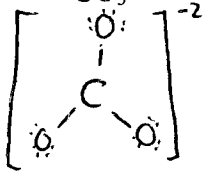
$HCCl_3$



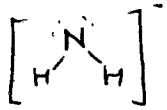
NH_4^+



CO_3^{-2}



NH_2^-



CO_2

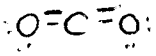


Chart of Bonding Type & Substance

Solutions

Compound	Bonding Type
Carbon tetra chloride	molecular
Water	molecular
Dry Ice	molecular
Sodium Chloride	ionic
Lead (II) Bromide	ionic
Silver Chloride	ionic
Sodium	metallic
Copper	metallic
Iron	metallic
Carborundum	covalent network
Sand	covalent network
Para Dichloro benzene	ionic