

UNIT 1

QUANTUM MECHANICS

ANSWERS

Quantum Theory Challenge ANSWERS

31

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 $n-1 \rightarrow$ this is the only change.)

$m_l = -l$ to $+l$

$m_s = +\frac{1}{2}$ and $-\frac{1}{2}$

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.

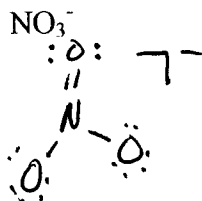
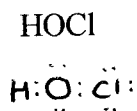
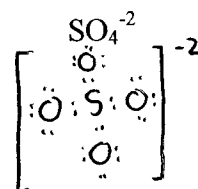
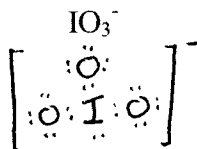
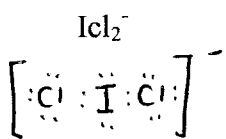
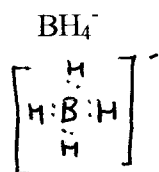
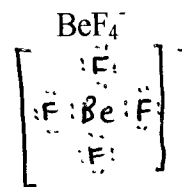
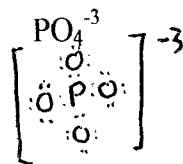
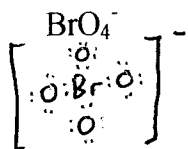
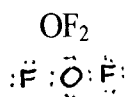
1. Most reactive non-metal N
2. Two major components of air B&C
3. Element that would form the basis of life Be
4. Highest oxidation state of aluminum +5
5. Element that would build strong bones Ar or Kr
6. People with high blood pressure should avoid this ClP
7. Most reactive alkali metal At
8. Charge 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 A S Sb
16. Common oxidation states of gold +1, +3
17. Formula of Argon aluminide Ar₃Al₂
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

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																														
F	Ne																														
Cl	Ar																														
Br	Kr																														
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

K Ca Sc Ti V Cr Mn Fe Co Ni
 Rb Sr Y Zr Nb Mo Tc Ru Rh Pd
 Ag Cd In Sn Sb Te
 Li Be B C N O
 Na Mg Al Si P S

Rules for Drawing Lewis Structures



VSEPR Theory

Rules for Finding Lone Pairs of Electrons

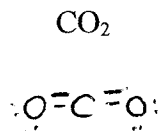
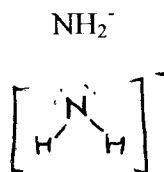
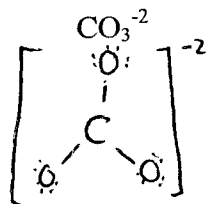
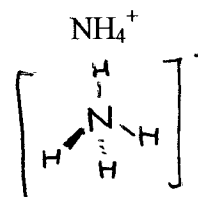
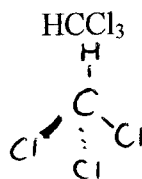
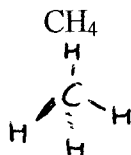
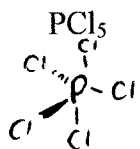
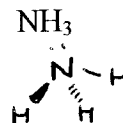
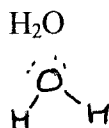
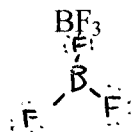
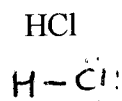


Chart of Bonding Type & Substance

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