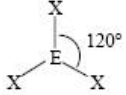
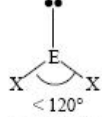
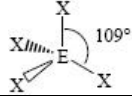
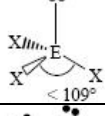
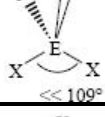
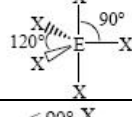
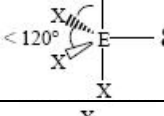
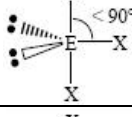
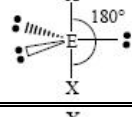
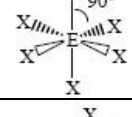
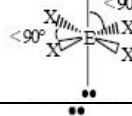
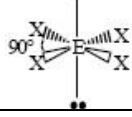


# of electron units off central atom	Name of Electron Geometry	Hybridization	# of Bonds off central atom	# of Lone pairs off central Atom	Overall Electron Geometry (B=bonds; E=e ⁻ pairs)	Name of Molecular Shape	Optimal Bond Angle	Picture E= central atom X= surrounding atoms : = lone pairs	Examples
2	Linear	sp	2	0	AB ₂	Linear	180°		BeH ₂ , HCN
3	Trigonal-planar	sp ²	3	0	AB ₃	Trigonal planar	120°		CO ₃ ²⁻ , BF ₃
			2	1	AB ₂ E	Bent	<120°		SO ₂
4	Tetrahedral	sp ³	4	0	AB ₄	Tetrahedral	109.5°		CH ₄
			3	1	AB ₃ E	Trigonal pyramidal	<109.5°		NH ₃
			2	2	AB ₂ E ₂	Bent	<<109.5°		H ₂ O
5	Trigonal-bipyramidal	sp ³ d	5	0	AB ₅	Trigonal-bipyramidal	90°, 120°		PCl ₅
			4	1	AB ₄ E	Seesaw	<90°, <120°		SF ₄
			3	2	AB ₃ E ₂	T-shaped	<90°		ClF ₃
			2	3	AB ₂ E ₃	Linear	180°		XeF ₂
6	Octahedral	sp ³ d ²	6	0	AB ₆	Octahedral	90°		SF ₆
			5	1	AB ₅ E	Square pyramidal	<90°		IF ₅
			4	2	AB ₄ E ₂	Square planar	90°		XeF ₄

Pictures from http://cobblearning.net/sherman/files/2012/11/vsepr_geometries1-2croy5e.png

Period																	18 VIII A	
	1 I A																2 II A	
1	1s															2 He 4.003		
2	2s																	
3	3s																	
4	4s																	
5	5s																	
6	6s																	
7	7s																	

atomic # →

atomic symbol →

atomic mass (rounded) →

29

Cu

63.55

1.9

← common oxidation states

← electronegativity (Pauling)

Gases

Liquids

Metalloids

		13 III A		14 IV A		15 V A		16 VI A		17 VII A		18 VIII A	
2p	5 B 10.81 2.04	6 C 12.01 2.55	7 N 14.01 3.04	8 O 16.00 3.44	9 F 19.00 3.98	10 Ne 20.18							
3p	13 Al 26.98 1.61	14 Si 28.09 1.9	15 P 30.97 2.19	16 S 32.07 2.58	17 Cl 35.45 3.16	18 Ar 39.95							
4p	31 Ga 69.72 1.81	32 Ge 72.64 2.01	33 As 74.92 2.18	34 Se 78.96 2.55	35 Br 79.90 2.96	36 Kr 83.80 3							
5p	49 In 114.8 1.78	50 Sn 118.7 1.96	51 Sb 121.8 2.05	52 Te 127.6 2.1	53 I 126.9 2.66	54 Xe 131.3 2.6							
6p	81 Tl 204.4 1.62	82 Pb 207.2 2.33	83 Bi 209.0 2.02	84 Po 209 2	85 At 210 2.2	86 Rn 222							
7p	Uut 284	Uuq 289	Uup 288	Uuh 292	Uus 293	Uuo 294							

		57 La 138.9 1.1		58 Ce 140.1 1.12		59 Pr 140.9 1.13		60 Nd 144.2 1.14		61 Pm 145 1.17		62 Sm 150.4 1.17		63 Eu 152.0 1.2		64 Gd 157.3 1.2		65 Tb 158.9 1.2		66 Dy 162.5 1.22		67 Ho 164.9 1.23		68 Er 167.3 1.24		69 Tm 168.9 1.25		70 Yb 173.0 1.3	
		89 Ac 227 1.1		90 Th 232.0 1.3		91 Pa 231.0 1.5		92 U 238.0 1.38		93 Np 237 1.36		94 Pu 239 1.28		95 Am 243 1.3		96 Cm 247 1.3		97 Bk 247 1.3		98 Cf 251 1.3		99 Es 252 1.3		100 Fm 257 1.3		101 Md 258 1.3		102 No 259 1.3	

lanthanides
(rare earth metals)

actinides

atomic # → 29 ← common oxidation states
 atomic symbol → Cu
 atomic mass (rounded) → 63.55
 ← electronegativity (Pauling) 1.9

Gases
 Liquids
 Metalloids

	13 III A	14 IV A	15 V A	16 VI A	17 VII A	18 VIII A
5p	5 B 10.81 2.04	6 C 12.01 2.55	7 N 14.01 3.04	8 O 16.00 3.44	9 F 19.00 3.98	10 Ne 20.18
3p	13 Al 26.98 1.61	14 Si 28.09 1.9	15 P 30.97 2.19	16 S 32.07 2.58	17 Cl 35.45 3.16	18 Ar 39.95
4p	31 Ga 69.72 1.81	32 Ge 72.64 2.01	33 As 74.92 2.18	34 Se 78.96 2.55	35 Br 79.90 2.96	36 Kr 83.80 3
5p	49 In 114.8 1.78	50 Sn 118.7 1.96	51 Sb 121.8 2.05	52 Te 127.6 2.1	53 I 126.9 2.66	54 Xe 131.3 2.6
6p	81 Tl 204.4 1.62	82 Pb 207.2 2.33	83 Bi 209.0 2.02	84 Po 209 2	85 At 210 2.2	86 Rn 222
7p	## Uut 284	## Uuq 289	## Uup 288	## Uuh 292	## Uus 293	## Uuo 294