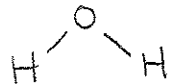
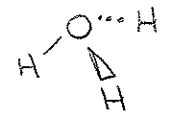
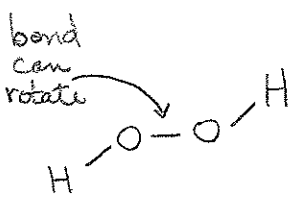


Molecule or Ion; Number of Valence Electrons	Lewis Structure(s)	Number of Electron Pairs at Central Atom (count multiple bonds as 1 pair)	Name of Electron Pair Geometry at Central Atom	3D Sketch (Atom Arrangement)	Name of Molecular Geometry at Central Atom	Charge Symmetry (Polar or Non-Polar?)	Central Atom Hybridization
1. $H_2O$ $\begin{array}{r} 2(1) \\ + 1(6) \\ \hline 8e^- \end{array}$	$H-\ddot{O}-H$	4	tetrahedral		bent	polar	$sp^3$
2. $H_3O^+$ $\begin{array}{r} 3(1) \\ + 1(6) \\ - 1(+1) \\ \hline 9e^- \end{array}$	$\left[ \begin{array}{c} H \\   \\ H-\ddot{O}-H \\   \\ H \end{array} \right]^+$	4	tetrahedral		trigonal pyramid	polar	$sp^3$

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3. CH <sub>4</sub> 1(4) +4(1) <hr/> 8e <sup>-</sup>	<pre>       H         H - C - H               H </pre>	4	tetrahedral	<pre>       H               C...H      / \     H   H </pre>	tetrahedral	non-polar	sp <sup>3</sup>
4. C <sub>2</sub> H <sub>4</sub> 2(4) 4(1) <hr/> 12e <sup>-</sup>	<pre>       H   H                   C = C                   H   H </pre>	3 at each C	trigonal planar at each C	<pre>       H   H        \ /         C = C        / \       H   H </pre>	trigonal planar at each C	non-polar	sp <sup>2</sup> at each C

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5. $H_2O_2$ $2(1)$ $+2(6)$ <hr/> $14e^-$	$H-\ddot{O}-\ddot{O}-H$	4 at each O	tetrahedral at each O	 other possibilities (see Part C)	bent at each O	non- polar  (but see Part C for other possibilities)	$sp^3$ at each O
6. $C_2H_2$ $2(4)$ $+2(1)$ <hr/> $10e^-$	$H-C\equiv C-H$	2 at each C	linear at each C	$H-C\equiv C-H$	linear at each C	non- polar	$sp$

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7. $\text{SF}_6$ $1(6)$ $+ 6(7)$ <hr/> $48e^-$		6	octahedral		octahedral	non-polar	$sp^3d^2$
8. $\text{PF}_5$ $1(5)$ $+ 5(7)$ <hr/> $40e^-$		5	trigonal bipyramid		trigonal bipyramid	non-polar	$sp^3d$

9.

Molecule or Ion; Number of Valence Electrons	Lewis Structure(s)	Number of Electron Pairs at Central Atom (count multiple bonds as 1 pair)	Name of Electron Pair Geometry at Central Atom	3D Sketch (Atom Arrangement)	Name of Molecular Geometry at Central Atom	Charge Symmetry (Polar or Non-Polar?)	Central Atom Hybridization
$N_2$ $2(5)$ $= 10e^-$	$:N \equiv N:$	2 at each N	linear at each N	$N \equiv N$	linear	non-polar	$sp$
$SF_4$ $1(6)$ $+ 4(7)$ $\hline 34e^-$		5	trigonal bipyramid	 (lone pr is on equatorial plane)	see saw	polar	$sp^3d$

10.

Molecule or Ion; Number of Valence Electrons	Lewis Structure(s)	Number of Electron Pairs at Central Atom (count multiple bonds as 1 pair)	Name of Electron Pair Geometry at Central Atom	3D Sketch (Atom Arrangement)	Name of Molecular Geometry at Central Atom	Charge Symmetry (Polar or Non-Polar?)	Central Atom Hybridization
11. CH <sub>4</sub> O $\begin{array}{r} 1(4) \\ + 4(1) \\ + 1(6) \\ \hline 14e^- \end{array}$		4 at C 4 at O	tetrahedral at C tetrahedral at O		tetrahedral at C bent at O	polar	sp <sup>3</sup> at C sp <sup>3</sup> at O
12. NH <sub>2</sub> <sup>-</sup> $\begin{array}{r} 1(5) \\ + 2(1) \\ - 1(-1) \\ \hline 8e^- \end{array}$		4	tetrahedral		bent	polar	sp <sup>3</sup>

13.

Molecule or Ion; Number of Valence Electrons	Lewis Structure(s)	Number of Electron Pairs at Central Atom (count multiple bonds as 1 pair)	Name of Electron Pair Geometry at Central Atom	3D Sketch (Atom Arrangement)	Name of Molecular Geometry at Central Atom	Charge Symmetry (Polar or Non-Polar?)	Central Atom Hybridization
$C_2H_4Cl_2$ $2(4)$ $+4(1)$ $+2(7)$ $\hline 26e^-$		<p>4 at each C</p> <p>4 at each C</p>	<p>tetrahedral at each C</p> <p>tetrahedral at each C</p>		<p>tetrahedral at each C</p> <p>tetrahedral at each C</p>	<p>polar</p> <p>polar as shown <u>but</u> can be non-polar if properly rotated</p>	<p><math>sp^3</math> at each C</p> <p><math>sp^3</math> at each C</p>
14. $SCN^-$ $1(6)$ $+1(4)$ $+1(5)$ $-1(-1)$ $\hline 16e^-$	<p>resonance structures</p>	<p>2 (at C)</p>	<p>linear</p>	<p>S-C≡N</p> <p>↕</p> <p>S=C=N</p> <p>(see also Part E)</p>	<p>linear</p>	<p>polar</p>	<p>sp</p>

