Chem 1020
Lewis structures worksheet

Complete in the following table:

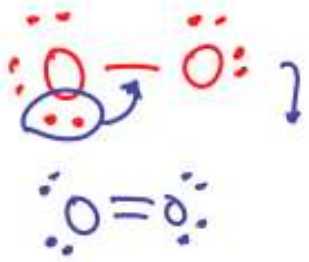
Correct shapes included although they're only necessary if specifically asked for.

Group:	IA	IVA	VA	VIA	VIIA
Element:	H	C	N	O	F/Cl/Br/I
# valence electrons:	1	4	5	6	7
Normal # covalent bonds:	1	4	3	2	1

For the following neutral molecules, calculate the total number of valence electrons and draw the correct Lewis structure. (For neutral molecules, it's okay to assume the normal numbers of covalent bonds apply and that the central atom is the first non-H element in the formula.)

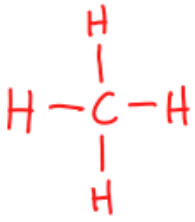
1. F_2 7 + 7 = 14 ve total

2. O_2 6 + 6 = 12 ve total

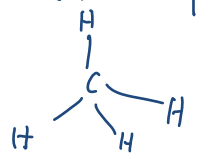


3. N_2 5 + 5 = 10 ve total

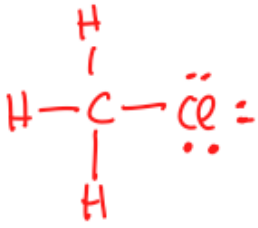
4. CH_4 4 + 4(1) = 8 ve total



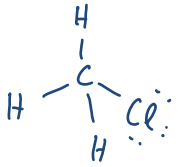
tetrahedral shape



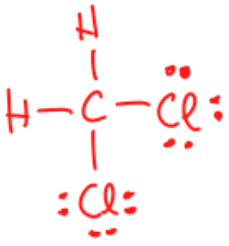
5. CH_3Cl 4 + 3(1) + 7 = 14 ve total



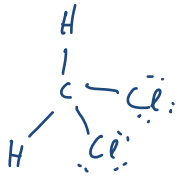
tetrahedral



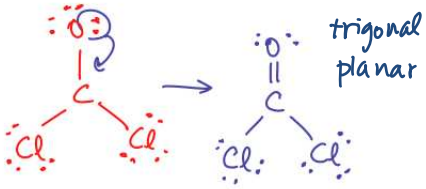
6. CH_2Cl_2 4 +2(1) + 2(7) = 20 ve total



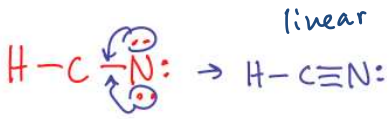
Tetrahedral



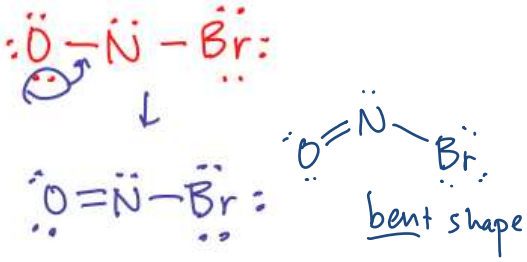
7. $COCl_2$ 6 + 4 + 2(7) = 24 ve total



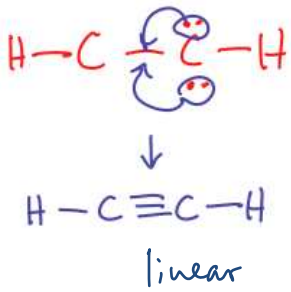
8. HCN 1 + 4 + 5 = 10 ve total



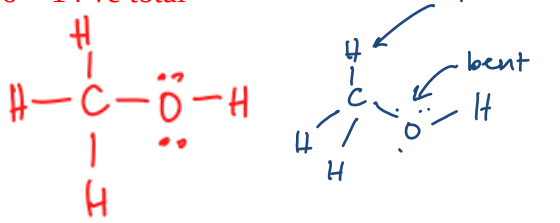
9. NOBr 5 + 6 + 7 = 18 ve total



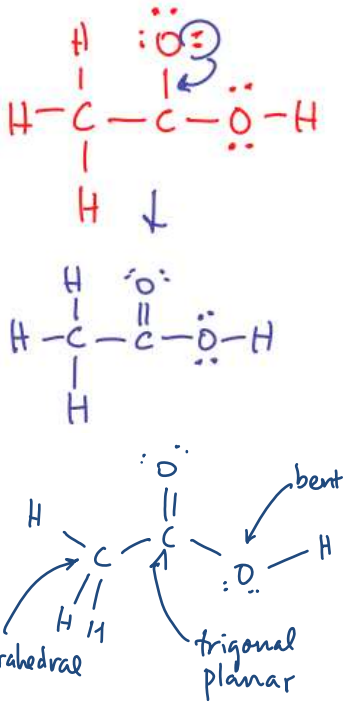
10. C_2H_2 2(4) + 2(1) = 10 ve total



11. CH_3OH 4 + 4(1) + 6 = 14 ve total

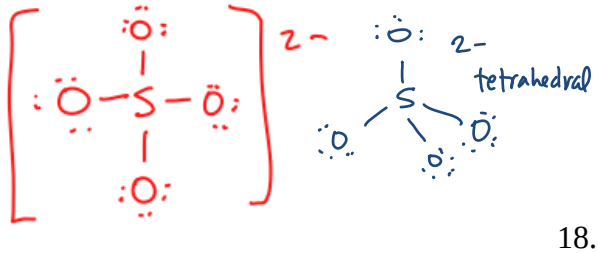


12. CH_3COOH (The formula gives you hints about the structure – use the normal number of bonds to complete it.)
2(4) + 4(1) + 2(6) = 24 ve total

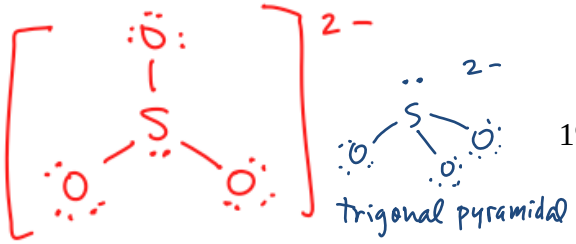


For the following polyatomic ions, write the ion's name, calculate the number of total valence electrons (being sure to take the charge into account) and draw the correct Lewis structures. (Remember, for polyatomic ions, the normal number of covalent bonds may not always apply! Complete the structure by following the octet rule and making sure the correct total number of valence electrons are showing.)

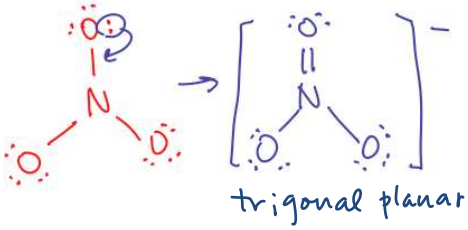
13. SO_4^{2-} Name: sulfate
6 + 4(6) + 2 = 32 ve total



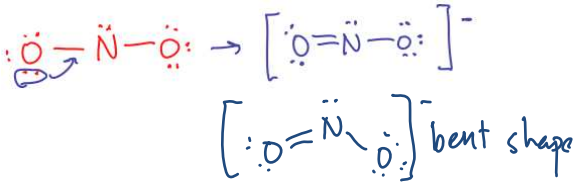
14. SO_3^{2-} Name: sulfite
6 + 3(6) + 2 = 26 ve total



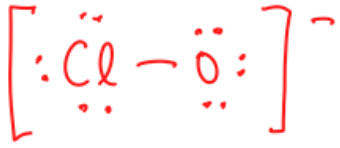
15. NO_3^- Name: nitrate
5 + 3(6) + 1 = 24 ve total



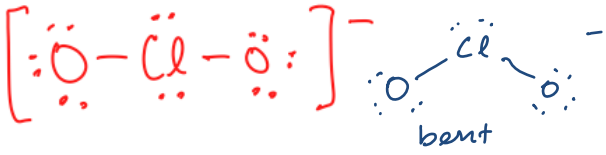
16. NO_2^- Name: nitrite
5 + 2(6) + 1 = 18 ve total



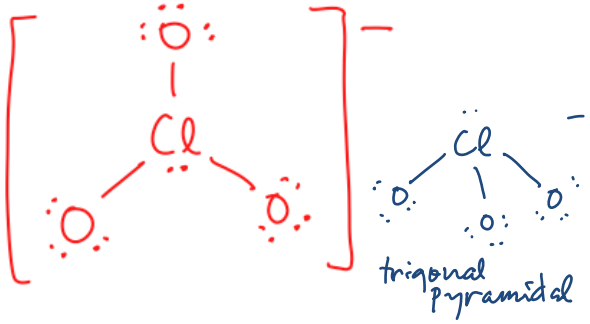
17. ClO^- Name: hypochlorite
7 + 6 + 1 = 14 ve total



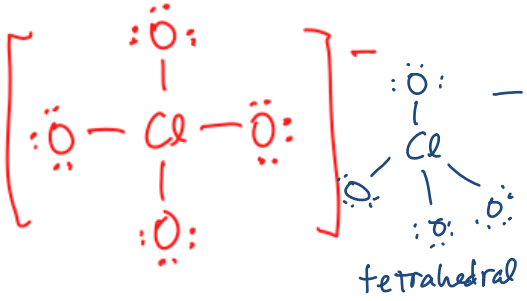
18. ClO_2^- Name: chlorite
7 + 2(6) + 1 = 20 ve total



19. ClO_3^- Name: chlorate
7 + 3(6) + 1 = 26 ve total

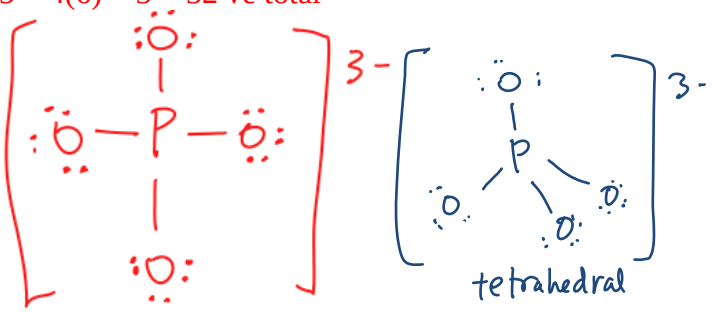


20. ClO_4^- Name: perchlorate
7 + 4(6) + 1 = 32 ve total



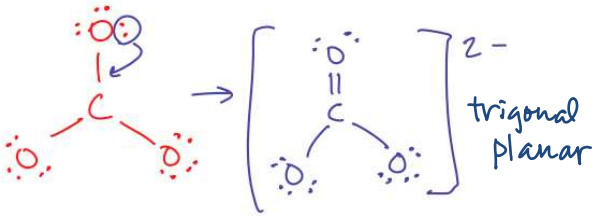
21. PO_4^{3-} Name: phosphate

5 + 4(6) + 3 = 32 ve total



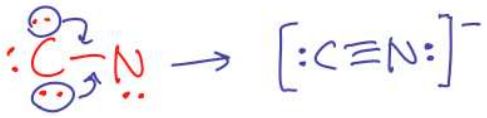
22. CO_3^{2-} Name: carbonate

4 + 3(6) + 2 = 24 ve total



23. CN^- Name: cyanide

4 + 5 + 1 = 10 ve total



24. NH_4^+ Name: ammonium

5 + 4(1) – 1 = 8 ve total