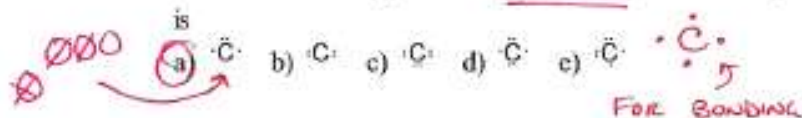


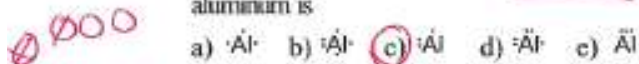
9 • Bonding & Molecular Structure

PRACTICE TEST

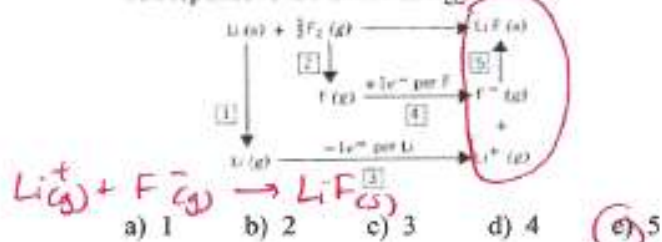
1. The correct Lewis symbol for ground state carbon



2. The correct Lewis symbol for ground state aluminum is



3. Using the picture below, what process corresponds to the lattice energy?



4. Which of the following favors formation of an ionic compound?

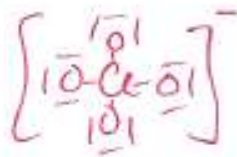
- a) low ionization energy for metal
 b) high electron affinity for non metal
 c) high lattice energy
 d) all of a-c above
 e) none of a-c above

5. Which of the atoms below is least likely to violate the octet rule?

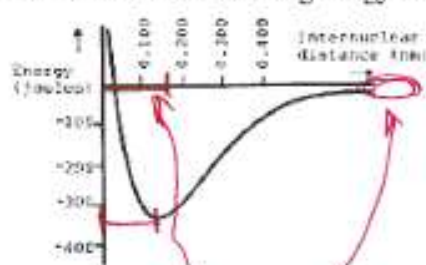
- a) Be b) P c) S d) B e) F
- FAM II CAN DO EXTENDED VAL. FAM III*

6. How many electrons are shown in the Lewis structure of perchlorate ion, ClO_4^- ?

- a) 30 b) 31 c) 32 d) 50 e) 51



- Questions 7 - 9 refer to the following energy diagram:



7. What is the energy of the two isolated atoms?

- a) -400 J d) 0.100 nm
 b) -335 J e) -155 J

c) 0 J

8. What is the bond length of the bond between the two atoms?

- a) 0.020 nm d) 0.330 nm

b) 0.140 nm

e) 2.00 nm

c) 0.400 nm

9. What is the bond energy (bond strength) of the bond?

a) 0 J

d) -330 J

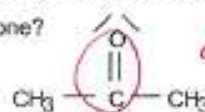
b) -110 J

e) -422 J

c) -10 J

SHOULD THIS BE (+) VALUE? Hmmm...

10. What is the bond order of the C-O bond in acetone?

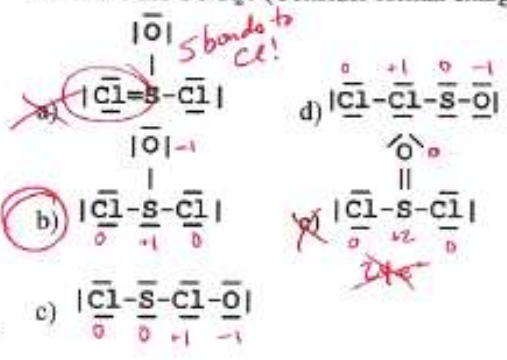


double = B.O. 2

- a) 4 b) 1.5 c) 0.5 d) 1 e) 2

S O Cl Cl
 $6+6+7+7=26e^-$

11. Which of the following is the correct Lewis structure for SOCl_2 ? (Consider formal charge)

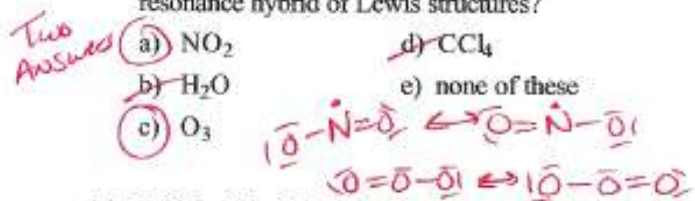


⊕ on S
 least electroneg.
 ⊖ on O
 most electroneg.

12. As the bond order of a carbon-carbon bond increases, which one of the following decreases?

- ~~a) # of electrons between the carbon atoms~~
- ~~b) vibrational frequency of bond vibrations~~
- ~~c) bond energy (bond strength)~~
- d) bond length

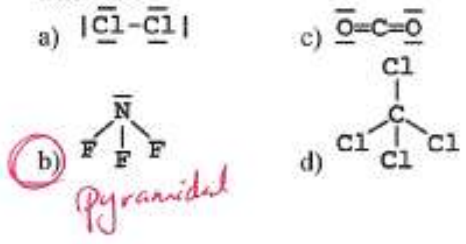
13. In which of the following is the actual compound a resonance hybrid of Lewis structures?



14. Which of the following bonds is most polar?



15. Which one of the following molecules is a polar molecule?



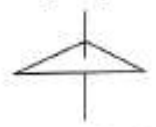
16. Which of the following molecular shapes has six atoms joined to a central atom?

- a) linear
- b) tetrahedral
- c) octahedral
- d) trigonal bipyramid
- e) planar triangular

17. Which molecular shape has bond angles which are not all the same?

- a) linear
 - b) tetrahedral
 - c) octahedral
 - d) planar triangular
 - e) trigonal bipyramid
- 90° & 120°*

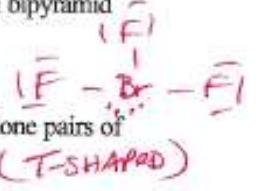
18. What molecular shape is pictured below?



- a) linear
- b) tetrahedral
- c) octahedral
- d) planar triangular
- e) trigonal bipyramid

19. The molecule BrF_3 has how many lone pairs of electrons on the central atom?

- a) 0
- b) 1
- c) 2
- d) 3



20. What is the geometrical arrangement of electron pairs in H_2O ?

- a) linear
 - b) bent
 - c) octahedral
 - d) trigonal bipyramidal
 - e) tetrahedral
- (molecule is bent)*

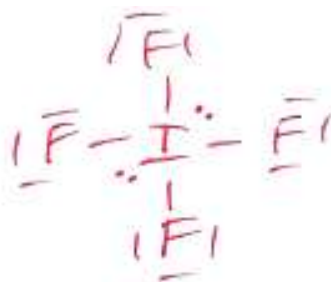
21. What is the shape of BrF_3 ?

- a) square planar
- b) T-shaped
- c) distorted tetrahedral
- d) pyramidal
- e) bent

Same as BrF_3 in #19

22. What is the shape of the IF_4^- ion?

- a) square planar
- b) tetrahedral
- c) square pyramidal
- d) octahedral
- e) T-shaped



SN = 6
 OCTAHEDRAL
 2 Lone Pairs

23. Which of the following is a polar species?

- a) CO_2 $O=C=O$
- b) PCl_5 $=P-$
- c) ICl_2^- ϕ
- d) $TeCl_4$ *see-saw* $\phi - Te - Cl$
- e) CCl_4 *TETRAHEDRAL* Cl

24. Among those listed below, which element will have the strongest tendency to form double bonds?

- a) S *can make double bonds*
- b) B
- c) Al
- d) O *makes double bonds all the time.*

Electronegativity Values							
H 2.1							He ---
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.0	O 3.5	F 4.0	Ne ---
Na 0.9	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.5	Cl 3.0	Ar ---
K 0.8	Cu 1.0	Ga 1.6	Ge 1.8	As 2.0	Se 2.4	Br 2.8	Kr ---
Rb 0.8	Sr 1.0	In 1.7	Sn 1.8	Sb 1.9	Te 2.1	I 2.5	Xe ---
Cs 0.7	Ba 0.9	Tl 1.8	Pb 1.8	Bi 1.9	Po 2.0	At 2.2	Rn ---
Fr 0.7							