

Name _____

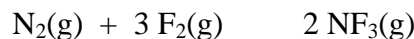
Grades will be posted Friday Morning.
Have a wonderful break!

Choose the single best answer to each question.

- Which of the following has the same electron configuration as P^{3-} ions?
 - Ti^{4+}
 - Mn^{5+}
 - As^{3-}
 - Ne
- Which of the following elements has the lowest ionization energy?
 - Br
 - Al
 - Mg
 - Cs
 - Ni
- The lattice energy for ionic compounds increases as the charge on the ions _____ and the size of the ions _____.
 - increases, increases
 - increases, decreases
 - decreases, increases
 - decreases, decreases
- Elements with _____ first ionization energies and _____ electron affinities generally form anions.
 - low, very negative
 - high, slightly negative
 - low, positive or slightly negative
 - high, very negative
- How many unpaired electrons are there in the species V^{3+} ?
 - zero
 - one
 - two
 - three
- Analysis of an unknown substance showed that it has a high boiling point and is brittle. It conducts electricity when melted, but not as a solid. Which of the following substances would have those characteristics?
 - HCl
 - Al
 - KBr
 - I_2

7. Which bond is most polar?
1. C–O 2. Cl–F 3. C–F 4. Si–F
8. Bond order is _____ proportional to bond energy and _____ proportional to bond length.
1. directly, directly
2. inversely, inversely
3. directly, inversely
4. inversely, directly
9. In which of the following species does the central atom have three unshared (lone) pairs in its Lewis structure?
1. SF_3^+ 2. ClF_2^- 3. BrF_3 4. GeCl_4
10. The central atom in IO_4^- is surrounded by
1. 4 single bonds, no double bonds and no lone pairs of electrons.
2. 3 single bonds, 1 double bond and no lone pairs of electrons.
3. 3 single bonds, 1 double bond and 2 lone pairs of electrons.
4. 4 single bonds, no double bonds and 2 lone pairs of electrons.
11. Which of the following species has resonance structures?
1. GeCl_4 2. HCO_2^- 3. BrF_3 4. SF_3^+
(C is central atom)
12. What is the formal charge on C and N in the molecule HCN?
1. C = +1, N = -1
2. C = 0, N = -1
3. C = +1, N = 0
4. C = 0, N = 0
13. Pure covalent bonds in which the bonding electrons are shared equally between two atoms only exist for
1. period 2 nonmetals.
2. group 14 nonmetals.
3. metals.
4. bonds between atoms of the same element.
5. ionic compounds.

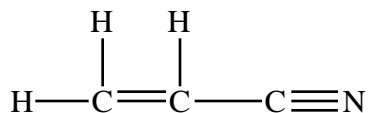
14. Given the following bond energies, calculate ΔH° for the reactions



Bond energies of $\text{N}_2 = 945 \text{ kJ/mol}$, $\text{F}_2 = 159 \text{ kJ/mol}$, $\text{N-F} = 272 \text{ kJ/mol}$

1. -210 kJ 2. 606 kJ 3. -560 kJ 4. 878 kJ
15. Which of the following species has an expanded octet?
1. HCO_2^- (C is central atom) 2. SF_3^+
3. GeCl_4 4. ClF_2^-
16. What is the molecular geometry of BrF_3 ?
1. T-shaped 2. trigonal planar
3. trigonal pyramid 4. square planar
17. Which of the following species has tetrahedral molecular geometry?
1. IF_4^- 2. XeF_4 3. SCl_4 4. GeCl_4
18. Which of the following species is planar (flat?)
1. GeCl_4 2. H_2S 3. SF_3^+ 4. TeCl_4
19. Which of the following species is polar?
1. IF_4^- 2. SO_3 3. TeCl_4 4. GeCl_4
20. Which statement below concerning BrF_3 is true?
1. The bonds are polar and the molecule is polar.
2. The bonds are nonpolar and the molecule is nonpolar.
3. The bonds are polar and the molecule is nonpolar.
4. The bonds are nonpolar and the molecule is polar.
21. In the species SF_3^+ the central atom uses hybrid orbitals of this type.
1. sp 2. sp^2 3. sp^3
4. sp^3d 5. sp^3d^2

22. How many sigma (σ) bonds and pi (π) bond are in the following molecule?



- | | | | | | |
|----|---|-------|----|---|-------|
| 1. | 4 | and 5 | 2. | 4 | and 2 |
| 3. | 6 | and 5 | 4. | 6 | and 3 |
23. What is the total number of valence electrons in the species IF_4^- ?
- | | | | | | | | |
|----|----|----|----|----|----|----|----|
| 1. | 36 | 2. | 16 | 3. | 30 | 4. | 24 |
|----|----|----|----|----|----|----|----|
24. Which of the following geometries is associated with sp^3d hybrid orbitals?
- | | | | |
|----|---------------|----|------------------|
| 1. | octahedral | 2. | trigonal pyramid |
| 3. | square planar | 4. | see-saw |
25. The fact that SO_3 is planar while SF_3^+ is trigonal pyramidal is best explained by which of the following statements?
1. Fluorine is more electronegative than oxygen.
 2. SO_3 has sp hybrid orbitals while SF_3^+ uses sp^2 hybrid orbitals.
 3. S in SF_3^+ has a lone pair of electrons while S in SO_3 does not.
 4. Fluorine is smaller than oxygen.