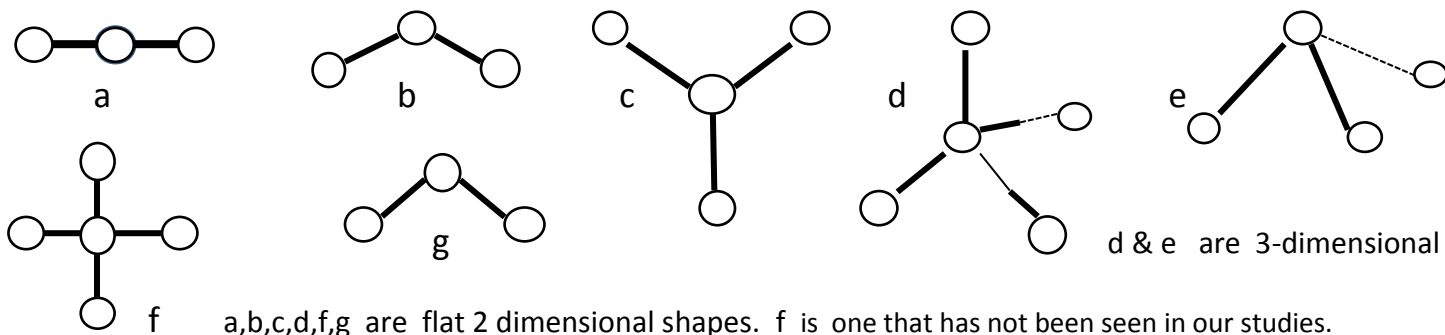


A number of molecular shapes are depicted below. Questions 14 & 15 refer to these



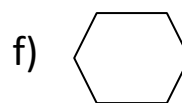
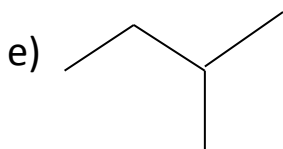
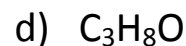
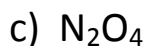
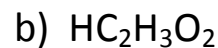
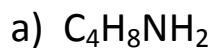
14. Name the molecular shape geometries and their bond angles. 9 pts + 1 (1.5 pts each)

- a) _____ b) _____ c) _____
 d) _____ e) _____ f) _____ (bonus)
 g) _____

15. Consider the following molecules and molecular ions. Write the letter of the molecular shape (depicted above) which best describes each of these. (in front of each formula in the space provided) one of these is a bonus! 18 pts + 1



16. Draw Lewis formulas for each of the following compounds. (there may be more than one isomer or resonance possible for each, in which case you may show these additional structures for a small 1 pt bonus (max 1 per system)) 18 pts +



17. Name three of the above (your choice). 9 pts (write the names by the structure)

18. Name the functional groups present in ; a) _____ b) _____ d) _____
 . question 16 above 6 pts / 60

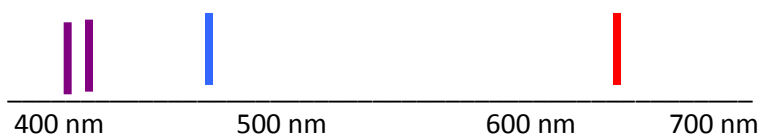
Info: electronegativities: H : 2.1 , B: 2.0 , C: 2.5 , N : 3.0 , O : 3.5 , F: 4.0 , S : 2.5 , Cl : 3.0 , I : 2.5 section# _____

Select the best answer and write the letter clearly in ink , in front of the question in the space provided. 4 pts each

- ____ 1. Which type of light has the greatest λ ? a) uv b) red c) green d) violet e) orange f) blue
- ____ 2. Which of these is most paramagnetic ? a) Ca b) Ti c) Eu d) Cu e) Br f) Al g) Kr
- ____ 3. Which ion has a noble gas configuration ? a) Ga^{3+} b) Mn^{2+} c) Sn^{4+} d) Mo^{6+} e) As^{3+} f) Lu^{3+}
- ____ 4. The configuration $[\text{Xe}]6s^24f^{14}5d^{10}$ is found in: a) Hg^+ b) Tl^+ c) Pb^{4+} d) Au^{2+} e) Sb^{3-} f) Bi^{5+}
- ____ 5. The number of valence electrons in selenium is: a) 2 b) 3 c) 4 d) 5 e) 6 f) 7 g) 34 h) 0
- ____ 6. The highest ionization energy is found in: a) Ca b) Fr c) P d) Sb e) Br f) Pb
- ____ 7. According to the quantum model – we have seen s, p, d, f sublevels. More are theoretically possible for example a “g” sublevel is the next hypothetically possible sublevel. In which principal quantum level would we first encounter this sublevel ? a) $n = 4$ b) $n = 5$ c) $n = 6$ d) $n = 7$ e) $n = 8$ f) $n = 9$
- ____ 8. How many electrons would be in a $\frac{1}{2}$ - filled “g” sublevel ? a) 4 b) 5 c) 6 d) 7 e) 8 f) 9 g) 18
- ____ 9. An electron’s magnetism results from its: a) spin b) wave c) energy d) charge e) low mass
- ____ 10. The electronegativity of fluorine is greater than that of chlorine principally because:
 a) the valence shell of fluorine experiences a nearly complete p configuration
 b) chlorine has greater nuclear charge
 c) the 2p subshell in fluorine experiences less screening than the 3p subshell of Cl
 d) chlorine has many more electrons
 e) F is above Cl on the periodic table

- ____ 11. Which of these molecules is most polar ? a) CO_2 b) NO_2^- c) SO_4^{2-} d) CH_3 e) O_3 f) NCl_3

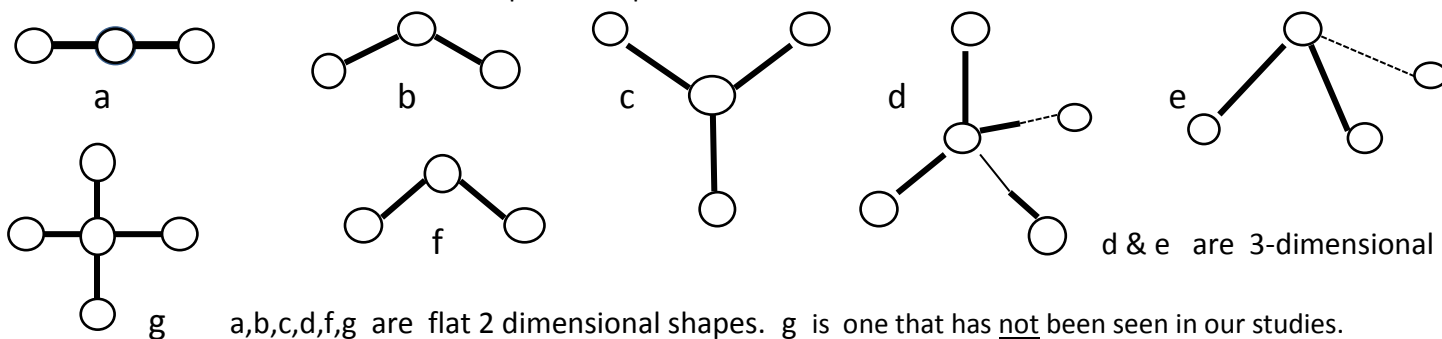
- ____ 12. The spectral lines obtained from glowing hydrogen in the visible region are:



The above spectral lines represent wavelengths of light when electrons undergo transitions from higher energy levels ($n=3$ or 4 or 5 or 6) to the $n = 2$ energy level. Which of these represents the energy obtained when an electron falls from $n = 3$ to $n = 2$?

- a) the first violet line b) the second violet line c) the blue line d) the red line e) not shown
- ____ 13. When an electron undergoes a transition from $n = 2$ to $n = 1$, where might you expect to see the line which results from this transition ? (assuming you could see it). Refer to question #12
 a) at about 600 nm b) at about 300 nm c) at about 800 nm d) close to 400 nm e) near 500 nm

A number of molecular shapes are depicted below. Questions 14 & 15 refer to these



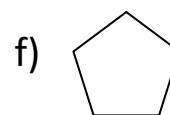
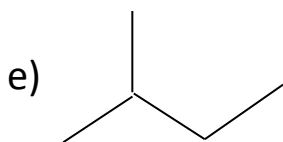
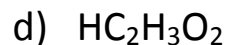
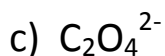
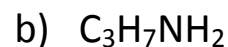
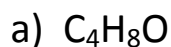
14. Name the molecular shape geometries and their bond angles. 9 pts + 1 (1.5 pts each)

- a) _____ b) _____ c) _____
 d) _____ e) _____ f) _____
 g) _____ (bonus)

15. Consider the following molecules and molecular ions. Write the letter of the molecular shape (depicted above) which best describes each of these. (in front of each formula in the space provided) one of these is a bonus ! 18 pts + 1



16. Draw Lewis formulas for each of the following compounds. (there may be more than one isomer or resonance possible for each, in which case you may show these additional structures for a small 1 pt bonus (max 1 per system)) 18 pts +

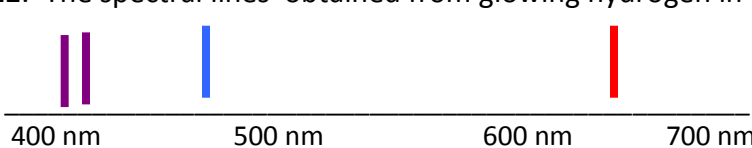


17. Name three of the above (your choice). 9 pts Write the letters & names by the structures

18. Name the functional groups present in: a) _____ b) _____ d) _____
 in question 16 above 6 pts

Info: electronegativities: H : 2.1 , B: 2.0 , C: 2.5 , N : 3.0 , O : 3.5 , F: 4.0 , S : 2.5 , Cl : 3.0 , I : 2.5 section# _____

Select the best answer and write the letter clearly in ink , in front of the question in the space provided. 3 pts each

- _____ 1. Which of these is most paramagnetic ? a) Ca b) Ti c) Cu d) Eu e) Br f) Al g) Kr
- _____ 2. Which ion has a noble gas configuration ? a) Ga³⁺ b) Mo⁶⁺ c) Sn⁴⁺ d) Mn⁴⁺ e) As³⁺ f) Lu³⁺
- _____ 3. The configuration [Xe]6s²4f¹⁴5d¹⁰ is found in: a) Hg⁺ b) Tl³⁺ c) Pb⁴⁺ d) Au²⁺ e) Sb³⁻ f) Bi³⁺
- _____ 4. The number of valence electrons in bromine is: a) 0 b) 1 c) 2 d) 3 e) 4 f) 5 g) 35 h) 7
- _____ 5. The highest ionization energy is found in: a) Ca b) Br c) P d) Sb e) Fr f) Pb
- _____ 6. According to the quantum model – we have seen s, p, d, f sublevels. More are theoretically possible . for example a “g” sublevel is the next hypothetically possible sublevel. In which principal quantum .. level would we first encounter this sublevel ? a) n = 4 b) n = 5 c) n = 6 d) n = 7 e) n = 8 f) n = 9
- _____ 7. How many electrons would be in a ½ - filled “g” sublevel ? a) 4 b) 5 c) 6 d) 7 e) 9 f) 10 g) 18
- _____ 8. An electron’s magnetism results from its: a) charge b) wave c) energy d) spin e) low mass
- _____ 9. The electronegativity of fluorine is greater than that of chlorine principally because:
 a) the valence shell of fluorine experiences a nearly complete p configuration
 b) the 2p subshell in fluorine experiences less screening than the 3p subshell of Cl
 c) chlorine has many more electrons
 d) F is above Cl on the periodic table
 e) chlorine has greater nuclear charge
- _____ 10. Which of these molecules is most polar ? a) AsO₂⁻ b) NO₂⁺ c) SO₄²⁻ d) CH₃ e) O₃ f) NCl₃
- _____ 11. Which type of light has the greatest λ ? a) uv b) blue c) green d) violet e) orange f) red
- _____ 12. The spectral lines obtained from glowing hydrogen in the visible region are:
- 
- 400 nm 500 nm 600 nm 700 nm
- The above spectral lines represent wavelengths of light when electrons undergo transitions from higher energy levels (n=3 or 4 or 5 or 6) to the n = 2 energy level. Which of these represents the energy obtained when an electron falls from n = 3 to n = 2 ?
 a) the first violet line b) the second violet line c) the blue line d) the red line e) not shown
- _____ 13. When an electron undergoes a transition from n = 2 to n = 1 , where might you expect to see the ... line which results from this transition ? (assuming you could see it). Refer to question #12
 a) at about 300 nm b) at about 600 nm c) at about 800 nm d) close to 400 nm e) near 500 nm