

- A radio station broadcasts at a frequency of 600 megahertz. What is the wavelength of this signal?
  - 2.0 m
  - 0.5 m
  - 1,800 m
  - 2,000 m
  - 5,000 m
- Calculate the energy of light having a frequency of  $2.0 \times 10^{10}$  hertz.
  - $3.3 \times 10^{-44}$  J
  - $6 \times 10^{18}$  J
  - $1.5 \times 10^{-2}$  J
  - $13.3 \times 10^{-24}$  J
  - $9.7 \times 10^{-34}$  J
- Choose the smallest atom below.
  - Si
  - S
  - Sn
  - Te
- Which has the smallest ionization energy?
  - Si
  - S
  - Sn
  - Te
- Which is the largest in size?
  - $O^{+1}$
  - O
  - $O^{-1}$
  - $O^{-2}$
  - All are the same size

Valence electrons are

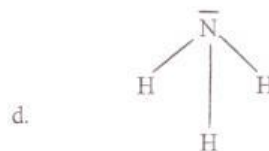
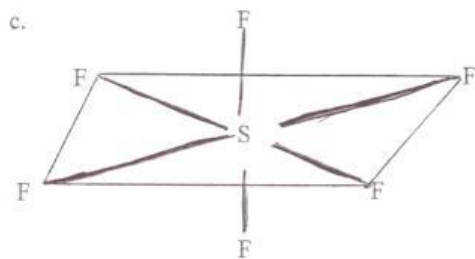
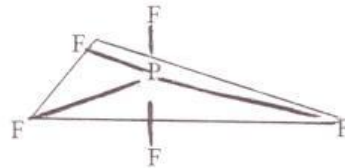
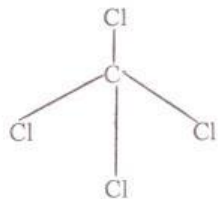
- the stable electrons
- the unstable electrons
- the inner shell electrons

- the outershell electrons
- the electrons outside the nucleus

- The shape of  $SO_2$  is
  - linear
  - planar triangular
  - tetrahedral
  - bent
  - T-shaped

8. The shape of  $\text{PCl}_5$  is  
 a. linear  
 b. planar triangular  
 c. pyramidal  
 d. tetrahedral  
 e. trigonal bipyramid
9. The shape of  $\text{PCl}_3$  is  
 a. linear  
 b. planar triangular  
 c. pyramidal  
 d. T-shaped  
 e. tetrahedral
10. The shape of  $\text{ClF}_3$  is  
 a. Linear  
 b. planar triangular  
 c. pyramidal  
 d. tetrahedral  
 e. T-shaped
11. Which element below has an electron configuration similar to P?  
 a. Si  
 b. S  
 c. N  
 d. C  
 e. O

12. Which of the following would be non polar?



- a. a  
 b. b  
 c. c  
 d. a, b, and c  
 e. all are non polar

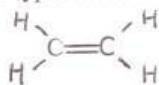
13. What kind of hybrid orbitals are used by S from question 12?

- a. sp
- b.  $sp^2$
- c.  $sp^3$
- d.  $sp^3d$
- e.  $sp^3d^2$

14. What kind of hybrid orbitals are used by N from question 12?

- a. sp
- b.  $sp^2$
- c.  $sp^3$
- d.  $sp^3d$
- e.  $sp^3d^2$

15. What two types of bonding orbitals are used by C in the compound



- a. sp and p
- b.  $sp^2$  and p
- c. s and p
- d. p and p
- e.  $sp^3$  and p

16. The attraction between positive and negative ions in a comp is called a(n)

- a. ionic bond
- b. covalent bond
- c. coordinate covalent bond
- d. electrostatic bond
- e. electronegative bond

17. How does the S-O bond length in SO<sub>2</sub> compare with the S-O bond length in SO<sub>3</sub>?

- a. SO<sub>2</sub> bond length is longer than SO<sub>3</sub> bond length
- b. SO<sub>2</sub> bond length is shorter than SO<sub>3</sub> bond length
- c. SO<sub>2</sub> bond length is the same as SO<sub>3</sub> bond length

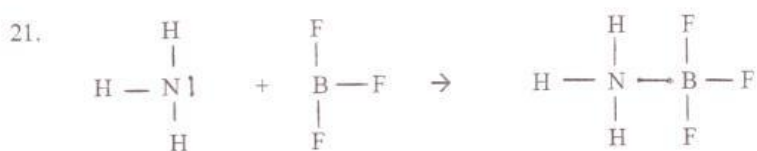
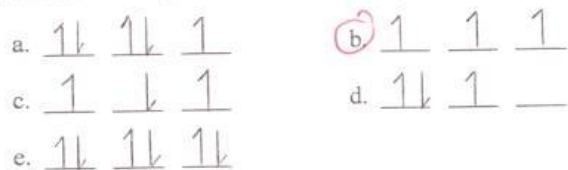
18. What is the expected bond angles in ethane C<sub>2</sub>H<sub>6</sub>?

- a. 60°
- b. 90°
- c. 109.5°
- d. 180°

19. Which of the following would contain three resonance forms when their Lewis structures are drawn?

- a. CO<sub>2</sub>
- b. SO<sub>2</sub>
- c. SO<sub>3</sub>
- d. NO<sub>2</sub><sup>-1</sup>
- e. a and c

20. The orbital diagram for As ends with 4p orbitals arranged like:



In the above reaction which is the coordinate covalent bond?

- a. H—N      b. B—F      c. N—B

22. The magnetic property exhibited by atoms that contain unpaired electrons is called

- a. electromagnetic  
 b. paramagnetic  
 c. diamagnetic  
 d. antimagnetic

23. The simplest compound between Si and H is

- a. SiH  
 b. SiH<sub>2</sub>  
 c. SiH<sub>3</sub>  
 d. SiH<sub>4</sub>  
 e. Si<sub>2</sub>H<sub>3</sub>

24. Given the following electronegativities (Na 1.0; Cl 2.9; Br 2.8, I 2.2) which bond would have the most ionic character?

- a. NaCl  
 b. NaBr  
 c. NaI

25. The ground state of an atom is the

- a. neutral state  
 b. lowest energy state  
 c. highest energy state  
 d. unstable state  
 e. solid state

26. Valence electrons are

- a. The charge on an atom
- b. the number of electrons in an atom's outer shell
- c. the loosely held electrons
- d. the number of electrons needed to complete the octet

27 The average bond order in  $\text{CO}_3^{-2}$  is

- a. 1
- b. 1.5
- c. 2
- d. 1.33
- e. 3

28 The mixing together of atomic orbitals of an atom is called

- a. blending
- b. interference
- c. cancellation
- d. bonding
- e. hybridization

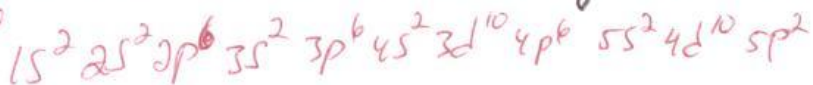
29 The ability of an atom to attract electrons in a covalent bond is called.

- a. Electron affinity
- b. Valence
- c. Electronegativity
- d. Ionization energy
- e. Polarity



Name Key

1. Write the electron configuration of Sn-50



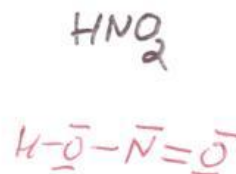
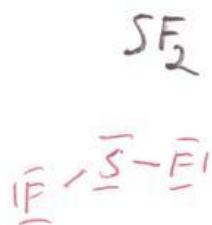
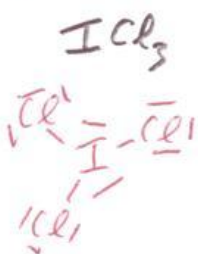
2. Use orbital sketches to describe how the bond in F-F is formed?



3. Give the 3 postulates of the valence bond theory.

- overlap
- $2e^-$  w/ opposite spins
- greater overlap = stronger bond

4. Draw Lewis structures. \*Include any resonance structures\*



27.5  
24  
102pt