Practice Test: Chemical Bonding and Shapes of Molecules

1. A type of chemical bond that is formed from the attraction of an atom that has lost an electron for an atom that has gained an electron is called a(n)

A. covalent bond.
B. ionic bond.
C. metallic bond
D. hydrogen bond

2. A type of chemical bond that is consists of positive ions in a sea of electrons a(n)

A. covalent bond.
B. ionic bond.
C. metallic bond
D. hydrogen bond

3. A weak attraction between a **hydrogen** atom in one molecule and an **oxygen** in another is called a(n)

A. ionic bond.
B. covalent bond
C. metallic bond
D. hydrogen bond

4. A pure substance melts at 88°C and does not conduct electricity in either the solid state or the liquid state. It does not dissolve very well in water but it does dissolve in nonpolar solvents is most likely to be

A. a metal
B. a network solid
C. an ionic compound
D. a covalent compound

5. A pure substance does not conduct electricity in the solid state but it does dissolve in water and the resulting solution conducts electricity. The substance has a fairly high melting point. The substance is most likely to be

A. an ionic compound
B. a covalent compound
C. a metal
D. a network solid

6. In a Lewis dot structure the dots represent

A. atomic nuclei
B. valence electrons
C. kernel electrons
D. protons

7. The total number of valence electrons in a molecule of CO_2 is

A. 4
B. 6
C. 16
D. 18

8. When covalent bonds are formed between atoms having different electronegativities, the electrons tend to spend more time at the atom with the greater electronegativity. Such chemical bonds are called

A. electrovalent bonds
B. polar covalent bonds
C. coordinate covalent bonds
D. none of the above

9. A negatively charged ion attracts a(n)

A. anion
B. cation
C. neutral atom
D. proton

Use the electronegativity scale below to answer the next two questions

Element	Electronegativity
F	4.0
O	3.5
Cl	3.0
Br	2.8
S	2.5
H	2.1
Al	1.5
Mg	1.2
Ca	1.0
Li	0.9
Na	0.9
K	0.8

10. Which pair of elements is **most** likely to form a covalently bonded compound?

A. Li and Cl
B. S and O
C. Ca and S
D. Na and Br
E. K and F

11. Which of these is most ionic

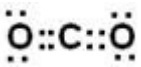
A. $AlCl_3$
B. $BaCl_2$
C. NaF
D. $MgBr_2$
E. H_2S

12. The correct name for the compound whose formula is $Cu_2SO_3$is

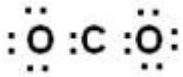
A. Copper (II) Sulfate
B. Copper (II) Sulfite
C. Copper (I) Sulfate
D. Copper (I) Sulfite
E. Copper (I) sulfide

13. Which of the electron dot structures above represents a carbon dioxide molecule?

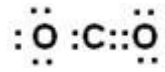
A.



B.



C.



D.

14. What kind of hybridization is found in a C=C Triple bond as in ethyne $HC{=}{=}CH$?

A. sp
B. sp^2
C. sp^3
D. None of the above

15. When SiH_4, PH_3, and H_2S are arranged in order of increasing bond angle, smallest bond angle first) which is the correct order?

A. PH_3, H_2S, SiH_4
B. PH_3, SiH_4, H_2S
C. SiH_4, PH_3, H_2S
D. H_2S, PH_3, SiH_4

16. Which of these bonds is the strongest?

A. C-O
B. C=O
C. $C{\equiv}O$
D. C-C

17. Which of these molecules has the shortest nitrogen to nitrogen bond length?

A. N_2
B. N_2F_2
C. N_2H_4
D. N_2H_2

Construct a Lewis electron dot structure model fo the following

18. Carbonate ion: CO_3^{2-}

19. Sulfur Trioxide SO_3

20. Nitrate Ion NO_3^-

Give the shape of each molecule or ion below selected from this list

A. Linear
B. Angular or Bent
C. Triangular Plane
D. Trigonal pyramid
E. Tetrahedron
F. Trigonal bipyramid
G. Octahedron

21. NO_3^-?

22. CO_3^{2-}?

23. SF_6?

24. SO_2?

25. NH_3?

26. PCl_5?

27. NH_4^+?

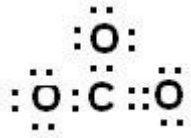
28. SO_4^{2-}?

29. SO_3^{2-}?

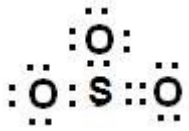
30. CO_2

Answer Key

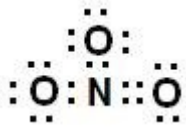
1. B Ionic bond
2. C. Metallic Bond
3. D Hydrogen bond
4. D covalent compound
5. A An ionic compound
6. B Valence Electrons
7. C 16 electrons
8. B Polar covalent bonds
9. B Cation (negative ions attract positive ions
10. B S and O
11. C NaF has the greatest electronegativity difference
12. D Copper (I) sulfite
13. A
14. A sp
15. D H_2S, PH_3, SiH_4 Lone pairs repell more strongly than bonded electrons. H_2S has the greatest number of lone pairs
16. C C═O Triple bonds are stronger than double and double are stronger than single
17. A N_2 it has a triple bond between the N atoms. It is shortest and strongest
18. Carbonate



19. Sulfur Trioxide



20. Nitrate



21. C
22. C
23. G
24. B
25. D
26. F
27. E
28. E
29. D
30. A