

1. Generally, how many valence electrons are needed for atoms to be most stable?  
 A 8  
 B 6  
 C 32  
 D 18
2. Which particles are gained, lost, or shared by an atom when it forms a chemical bond?  
 A nucleons  
 B neutrons  
 C protons  
 D electrons
3. Which type of bonding is characteristic of a substance that has a high melting point and electrical conductivity only in the liquid phase (Or when dissolved in a solvent)?  
 A metallic  
 B ionic  
 C network covalent  
 D polar covalent
4. What is the maximum number of covalent bonds that a carbon atom can form?  
 A 1  
 B 2  
 C 3  
 D 4
5. Which type of bonding is found in all molecular substances?  
 A ionic bonding  
 B metallic bonding  
 C covalent bonding  
 D hydrogen bonding

6. Which element has an atom with the greatest tendency to attract electrons in a chemical bond?

- A chlorine
- B sulfur
- C silicon
- D carbon

7. Which type of bond results when one or more valence electrons are transferred from one atom to another?

- A an ionic bond
- B a hydrogen bond
- C a polar covalent
- D a nonpolar covalent

8. Which substance contains bonds that involved the transfer of electrons from one atom to another?

- A  $\text{CO}_2$
- B KBr
- C  $\text{Cl}_2$
- D  $\text{H}_2\text{O}$

9. The chemical bonding in sodium phosphate is classified as

- A both covalent and ionic
- B ionic, only
- C metallic, only
- D covalent, only

10. Conductivity in a metal results from the metal atoms having

- A high electronegativity
- B high ionization energy
- C highly mobile protons in the nucleus
- D highly mobile electrons in the valence shell

11. Which terms describe a substance that has a low melting point and poor electrical conductivity?

- A covalent and metallic
- B covalent and molecular
- C ionic and molecular
- D ionic and metallic

12. Which substance at STP conducts electricity because the substance contains mobile electrons?

- A K
- B H
- C He
- D Kr

13. Which formula represents a nonpolar molecule containing polar covalent bonds?

- A H<sub>2</sub>O
- B CCl<sub>4</sub>
- C H<sub>2</sub>
- D NH<sub>3</sub>

14. Which formula represents a polar molecule?

- A CO<sub>2</sub>
- B H<sub>2</sub>
- C CCl<sub>4</sub>
- D H<sub>2</sub>O

15. The bond between hydrogen and oxygen in a water molecule is classified as nonpolar covalent

- A True
- B False

16. Which formula represents a tetrahedral molecule?

- A CCl<sub>4</sub>
- B H<sub>2</sub>
- C CaCl<sub>2</sub>
- D HBr

17. Which molecule has an asymmetric charge distribution?

- A N<sub>2</sub>
- B CCl<sub>4</sub>
- C NH<sub>3</sub>
- D Cl<sub>2</sub>

18. Carbon dioxide has a linear geometry

- A True
- B False

19. Which type of attraction results from the formation of weak momentary dipoles?

- A Dispersion (van der Waals) forces
- B metallic
- C ionic
- D hydrogen bonding

20. A diamond is an example of

- A a supercooled liquid
- B an ionic compound
- C a network solid
- D a metallic substance

21. HBr would be expected to have a higher boiling point than HF

- A True
- B False

22. What type(s) of intermolecular forces are present between molecules of CO<sub>2</sub>?

- A Dispersion (Van Der Waals)
- B Dipole-Dipole
- C Hydrogen Bonding
- D A and B

23. What is the formula for the compound that forms between magnesium and oxygen?

- A MgO
- B MgO<sub>2</sub>
- C Mg<sub>2</sub>O
- D Mg<sub>2</sub>O<sub>3</sub>

24. Which of the following substances contains hydrogen bonding?

- A CH<sub>4</sub>
- B NH<sub>3</sub>
- C PH<sub>3</sub>
- D H<sub>2</sub>

25. Which formula represents a molecular substance?

- A  $\text{Al}_2\text{O}_3$
- B  $\text{Li}_2\text{O}$
- C  $\text{CaO}$
- D  $\text{CO}$

26. The electrons in a bond between two iodine atoms ( $\text{I}_2$ ) are shared

- A equally, and the resulting bond is nonpolar
- B unequally, and the resulting bond is nonpolar
- C equally, and the resulting bond is polar
- D unequally, and the resulting bond is polar

27. The weakest Dispersion forces of attraction exist between molecules of

- A  $\text{I}_2$
- B  $\text{Br}_2$
- C  $\text{Cl}_2$
- D  $\text{F}_2$

28. What is the name of the ionic compound with the formula  $\text{Ni}_2(\text{SO}_4)_3$ ?

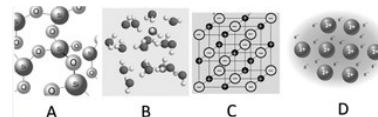
- A nickel (II) sulfate
- B nickel (III) sulfate
- C nickel (III) sulfide
- D nickel sulfate

29. Which of the following chemical formulas correctly represents the compound aluminum hydroxide?

- A  $\text{AlOH}$
- B  $\text{Al}_3\text{OH}$
- C  $\text{AlOH}_3$
- D  $\text{Al}(\text{OH})_3$

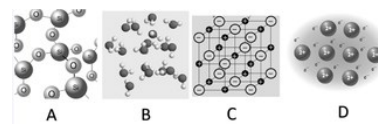
30. What type of bonds are present in substance A?

- A molecular covalent
- B network covalent
- C ionic
- D metallic



31. Which substance would conduct heat and electricity as a solid?

- A
- B
- C
- D



32. Chloroform ( $\text{CHCl}_3$ ) was one of the first anesthetics used in medicine. The chloroform molecule contains 26 valence electrons total. How many of these valence electrons are part of covalent bonds?

- A 26
- B 4
- C 8
- D 18

33. The name of  $\text{CaCl}_2$  is calcium dichloride.

- A True
- B False

34. In which of these compounds is the bond between the atoms NOT a nonpolar covalent bond?

- A  $\text{O}_2$
- B  $\text{H}_2$
- C  $\text{HCl}$
- D  $\text{Cl}_2$

35. In a crystal lattice of an ionic compound, each cation is surrounded by

- A molecules
- B positive ions
- C anions
- D metals

36. That the boiling point of water ( $\text{H}_2\text{O}$ ) is higher than the boiling point of hydrogen sulfide ( $\text{H}_2\text{S}$ ) is explained by<sup>2</sup>

- A the difference in bond polarities
- B the difference in molecule polarities
- C the difference in the strength of the dispersion forces
- D the different types of intermolecular forces

37. Draw the Lewis Structure of copper (I) oxide and show Ms. Martin for credit for this question.

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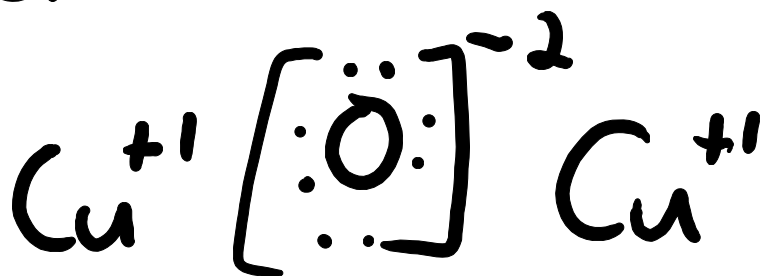
38. Draw the Lewis structure of  $\text{CCl}_2\text{F}_2$  and show Ms. Martin for credit for this question.

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37.



38.

