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In each of the given compound, indicate (in the blanks) the noble gas atoms that have the same electron configurations as those of the elements in the compound.

21. K_2O Electron configuration of K is similar to that of element _____.
Electron configuration of O is similar to that of element _____.
22. CaS Electron configuration of Ca is similar to that of element _____.
Electron configuration of S is similar to that of element _____.
23. AlI_3 Electron configuration of Al is similar to that of element _____.
Electron configuration of I is similar to that of element _____.
24. Cs_3N Electron configuration of Cs is similar to that of element _____.
Electron configuration of N is similar to that of element _____.
25. BeH_2 Electron configuration of Be is similar to that of element _____.
Electron configuration of H is similar to that of element _____.
26. $SrBr_2$ Electron configuration of Sr is similar to that of element _____.
Electron configuration of Br is similar to that of element _____.
27. Ba_3P_2 Electron configuration of Ba is similar to that of element _____.
Electron configuration of P is similar to that of element _____.
28. Al_2Se_3 Electron configuration of Al is similar to that of element _____.
Electron configuration of Se is similar to that of element _____.
29. Rb_3P Electron configuration of Rb is similar to that of element _____.
Electron configuration of P is similar to that of element _____.
30. B_2O_3 Electron configuration of B is similar to that of element _____.
Electron configuration of O is similar to that of element _____.
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Chemical bonding: Recalling concept facts and definitions

1. Chemical bonding is the simultaneous attraction of two nuclei to
1) Protons 2) Neutrons 3) Electrons 4) Positron
2. When atoms bond, their stability
1) Increase 2) Decrease 3) Remain the same
3. When atoms bond, the electron configuration of each atom in the bond resembles those of the nearest
1) Noble gas 2) Halogen 3) Alkaline earth 4) Alkali
4. Atoms bond due to the interaction between
1) Protons and neutrons 3) Neutrons and electrons
2) Protons and electrons 4) Neutrons and positrons
5. One main reason atoms bond is to
1) Get a stable electron configuration 3) To gain protons
2) Get an unstable electron configuration 4) To lose x

Stability of atoms in a bond: Determining elements that bonded atoms resemble

1. When a hydrogen atom bonds with another atom, the electron configuration of the hydrogen atom will be similar to that of the element
1) Lithium 2) Oxygen 3) Neon 4) Helium
2. When an atom of oxygen bonds with a metal, the electron configuration of the oxygen ion will be similar to the configuration of which atom?
1) Neon 2) Fluorine 3) Helium 4) Sulfur
3. When the atom of calcium bonds with oxygen to produce calcium oxide, the electron configuration of calcium ion in the compound will resemble that of the element
1) O 2) Ar 3) Kr 4) K
4. Which compound contains ions with electron configurations of both ions similar to that of Helium?
1) LiH 2) LiF 3) NaH 4) NaCl
5. In which compound would the configuration of the atoms in the compound resembles that of Argon?
1) Al_2O_3 2) K_2O 3) $CaCl_2$ 4) NaCl
6. A bond between which two atoms would produce ions with electron configurations similar to those of Kr and Ne respectively?
1) Li and Cl 2) K and Cl 3) Al and Br 4) Sr and F
7. When sodium and fluorine atoms combine to produce the compound NaF, the ions formed have the same electron configuration as the atom of
1) Argon, only 3) Both argon and neon
2) Neon, only 4) Neither argon and neon
8. When the atoms of magnesium and chlorine bond to form the compound $MgCl_2$, the electrons configuration of the ions in this compound will resemble those of
1) Calcium and Bromine 3) Neon and Helium
2) Beryllium and Fluorine 4) Neon and Argon
9. Atom X and atom Y bond to form a compound. The electron configuration of X in the bond is 2 - 8 - 8. The electron configuration of Y in the compound is 2 - 8. Which two atoms could be X and Y?
1) X could be magnesium and Y could be sulfur 3) X could be calcium and Y could be sulfur
2) X could be magnesium and Y could be oxygen 4) X could be calcium and Y could be oxygen
10. Which statement is true of the electron configurations of the ions in the compound potassium bromide?
1) Potassium ion will resemble that of Krypton, and bromine ion will resemble that of Argon
2) Potassium ion will resemble that of Argon, and bromine ion will resemble that of Krypton
3) Both potassium and bromine ions will resemble the configuration of argon
4) Both potassium and bromine ions will resemble the configuration of krypton

5. Ionic bonding: Recalling concept facts and definition

1. Ionic bonding usually occurred between the atoms of
 - 1) A metal and another metal
 - 2) A nonmetal and another nonmetal
 - 3) A metal and a nonmetal
 - 4) Two of the same metalloid
2. When combining with nonmetallic atoms, metallic atoms generally
 - 1) Lose electrons and form negative ions
 - 2) Lose electrons and form positive ions
 - 3) Gain electrons and form negative ions
 - 4) Gain electrons and form positive ions
3. When combining with a metallic atom, a nonmetallic atom tends to
 - 1) Lose electrons and forms a negative ion
 - 2) Lose electrons and forms a positive ion
 - 3) Gain electrons and forms a negative ion
 - 4) Gain electrons and forms a positive ion
4. When two atoms form an ionic bond, the electronegativity difference between these two atoms is generally
 - 1) Greater than 1.7
 - 2) Less than 1.7
 - 3) Exactly zero
 - 4) Less than Zero
5. In ionic bonding, electrons are
 - 1) Always shared between a metal and a nonmetal atoms
 - 2) Always shared between two different nonmetals atoms
 - 3) Always transferred from a metal atom to a nonmetal atom
 - 4) Always transferred from a nonmetal atom to a metal atom
6. Ionic bonding is formed when
 - 1) A Nonmetal loses electrons to a metal, which gains the electrons
 - 2) A Nonmetal loses electrons another nonmetal, which gains the electron
 - 3) A Metal atom loses electrons to a another metal, which gains the electrons
 - 4) A Metal atom loses electrons to a nonmetal, which gains the electrons
7. Which is true of a metallic atom in ionic bond with a nonmetal atom?
 - 1) The metal is usually a positive charged ion, because it had loss electrons
 - 2) The metal is usually a positive charged ion, because it had gained electrons
 - 3) The metal is usually a negative charged ion, because it had loss electrons
 - 4) The metal is usually a negative charged ion, because it had gained electrons
8. When a nonmetal atom forms ionic bond with a metal, the nonmetal becomes a
 - 1) A positive ion, because it had gained electrons
 - 2) A positive ion, because it had gained protons
 - 3) A negative ion, because it had gained electrons.
 - 4) A negative ion, because it had gained protons.

6. Covalent Bonding: Recalling concept facts and definitions

1. A Covalent bond is formed between atoms of
 - 1) Two nonmetals
 - 2) Two metals
 - 3) A metal and a nonmetal
 - 4) A metal and a metalloid
2. Covalent bonding occurs when electrons are
 - 1) Transferred from a metallic atom to a nonmetallic atom
 - 2) Transferred from a nonmetallic atom to a metallic atom
 - 3) Shared between metallic atoms
 - 4) Shared between nonmetallic atoms
3. When two atoms form a covalent bond, the electronegativity difference between these two atoms is generally
 - 1) Greater than 1.7
 - 2) Less than 1.7
 - 3) Exactly zero
 - 4) Less than Zero
4. The sharing of electrons in covalent bonding
 - 1) Must always be equal
 - 2) Must always be unequal
 - 3) Is either equal nor unequal
 - 4) Can be equal or unequal
5. Which list includes only types of covalent bonding?
 - 1) Polar, Nonpolar, and metallic
 - 2) Polar, nonpolar, and network solid
 - 3) Network solid, polar, and metallic
 - 4) Network solids, metallic, and nonpolar

7. Polar and Nonpolar Covalent bonding: Recalling concept facts and definitions

- The bonding in polar covalent bonding occurs when
 - Two of the same metals share electrons
 - Two of the same nonmetals share electrons
 - Two different metals share electrons
 - Two different nonmetals share electrons
- Sharing of electrons in polar covalent bonding is usually
 - Unequal between two different nonmetals
 - Unequal between two of the same nonmetals
 - Equal between two different nonmetals
 - Equal between two of the same nonmetals
- The bonding in nonpolar covalent bonding occurs when
 - Two of the same metals share electrons
 - Two of the same nonmetals share electrons
 - Two different metals share electrons
 - Two different nonmetals share electrons
- Sharing in nonpolar covalent bonding is usually
 - Unequal between two different nonmetals
 - Unequal between two of the same nonmetals
 - Equal between two of the same nonmetals
 - Equal between two different nonmetals
- When two atoms form a polar covalent bond, the electronegativity difference between these two atoms is generally
 - Exactly zero
 - Below Zero
 - Less than 1.7 but greater than zero
 - Greater 1.7
- When two atoms formed a nonpolar covalent bond, the electronegativity difference between these two atoms is usually
 - About zero
 - Below Zero
 - Exactly 1.7
 - Greater 1.7

9. Metallic bonding: Recalling concept facts and definitions

- Metallic bonding is best described as
 - Positive ions in the sea of positive electrons
 - Positive ions in the sea of mobile electrons
 - Negative ions in the sea of positive electrons
 - Negative ions in the sea of mobile electrons
- Metallic bonding occurs between metal atoms that have
 - Filled energy levels and low ionization energy
 - Filled energy levels and high ionization energy
 - Unfilled energy levels and low ionization energy
 - Unfilled energy levels and high ionization energy
- The ability to conduct electricity in the solid state is a characteristic of metallic substances. This characteristics is best explained by the presence of
 - High ionization energy
 - High electronegativity
 - Mobile protons
 - Mobile electrons

12. Covalent bond: Determining formulas and names containing covalent bonding

- Which chemical formula contains atoms that are held together by covalent bonds?
 - KCl
 - CaCl₂
 - AlCl₃
 - HCl
- Which pair of atoms are held together by a covalent bond?
 - N-H
 - Li-H
 - Na-H
 - Ca - H
- Which substance has atoms held together by a covalent bond?
 - H₂
 - Na
 - NaCl
 - NaH
- Which compound contains atoms held together by covalent bonds?
 - Sodium chloride
 - Calcium hydride
 - Aluminum oxide
 - Nitrogen (II) oxide
- Which element would most likely form a covalent bond with a chlorine atom?
 - Iron
 - Beryllium
 - Phosphorous
 - Potassium
- A covalent bond will form between elements from which two groups of the Periodic Table?
 - Group 16 and Group 18
 - Group 16 and Group 17
 - Group 1 and Group 2
 - Group 13 and Group 17

11. Ionic Bonding: Determining formulas and names containing ionic bonding

- In which formula would the bonding between the atoms be described as ionic?
1) HNO_3 2) NH_4 3) H_2O 4) KCl
- Which bond is ionic?
1) $\text{N}-\text{O}$ 2) $\text{Na}-\text{O}$ 3) $\text{C}-\text{O}$ 4) $\text{H}-\text{F}$
- Which pair of elements form a bond that is mostly ionic?
1) CaCl_2 2) CCl_4 3) HCl 4) PCl_5
- Atoms in which compound are held together by ionic bonds?
1) CH_4 2) AlCl_3 3) H_2O 4) NH_3
- Which element would most likely form an ionic bond with chlorine?
1) O 2) N 3) S 4) Sr
- Which electron configuration belongs to an element that would form an ionic bond with aluminum?
1) 2-3 2) 2-8-14-2 3) 2-8-6 4) 2
- Which compound contains elements that are held together by ionic bonds?
1) Carbon dioxide 3) Lithium bromide
2) Carbon monoxide 4) Hydrogen bromide
- Which pair of atoms will form an ionic bond?
1) Hydrogen and sulfur 3) Magnesium and magnesium
2) Hydrogen and oxygen 4) Magnesium and phosphorus
- Elements in which two Groups of the Periodic Table would combine to form a bond that is ionic?
1) Group 1 and Group 2 3) Group 2 and Group 16
2) Group 2 and Group 13 4) Group 17 and Group 18
- Element X combines with rubidium to form an ionic bond. In which Group of the Periodic Table could element X be found?
1) Group 1 3) Group 2
2) Group 13 4) Group 16

14. Metallic bonding: Determining formulas and names containing metallic bonding

- In which substance would the atoms be held together by metallic bonding?
1) Calcium 2) Carbon 3) Oxygen 4) Helium
- The atoms of which substance are held together by a metallic bond?
1) $\text{H}_2(\text{g})$ 2) $\text{H}_2\text{O}(\text{l})$ 3) $\text{SiC}(\text{s})$ 4) $\text{Fe}(\text{s})$
- Which substance contains metallic bonding?
1) Sodium Chloride 3) Hydrogen chloride
2) Carbon 4) Copper
- Which electron configuration belongs to a substance whose atoms are held together by metallic bonds?
1) 2-8-8 2) 1 3) 2-8-18-18 4) 2-8-18-5

16. Types of bonds: Determining formula based on bond description

- Which substance contains bonds resulting from a transfer of electrons from one atom to another?
1) CO_2 2) NH_3 3) KBr 4) Cl_2
- Which pair of atoms will share electrons when a bond is formed between them?
1) Ba and I 2) Br and F 3) K and Cl 4) Li and I
- In which compound do the atoms form bonds by sharing electrons?
1) CCl_4 2) Na_2O 3) CaO 4) MgO
- In which substance is the bonding between the atoms a result of equal sharing of electrons?
1) Br_2 2) Na 3) CO_2 4) NH_3
- In which substance is the bonding between the atoms a result of positive ions in the sea of mobile electrons?
1) C 2) N_2 3) He 4) Ni
- The bonding in which compound a result of unequal sharing of electrons between the atoms?
1) H_2S 2) H_2 3) Cl_2 4) NaCl
- Which pair of atoms will form a bond when electrons are transferred from one atom to the other?
1) C and O 2) Ca and O 3) N and O 4) O and O
- Which pair of electrons configurations belong to atoms that will share electrons when they bond with each other?
1) 2-8-2 and 2-8-1 3) 2-8-6 and 2-8-18-7
2) 2-8-18-8 and 2-8-13-1 4) 2-8-5 and 2-8-18-8-1

Set A: Terms and definitions

Objective: By defining these words, you should become more familiar with types of bonding related terms and their definitions.

Define, neatly and clearly, the following bonding related terms.

1. Intramolecular forces
2. Ionic bond
3. Covalent bond
4. Polar covalent bond
5. Nonpolar covalent bond
6. Network solid covalent bond
7. Coordinate covalent bond
8. Metallic bond

Set B: Type of bonding

Objective: To test your knowledge of facts related to bond types.

Indicate which bond type is described by each statement below. Use the list of bond types below. Ionic, covalent, polar covalent, nonpolar covalent, coordinate covalent, network solid covalent, metallic.

9. A bond in which two atoms share electrons unequally. _____
10. A bond in which the two atoms have electronegativity difference of zero. _____
11. Bonding in which positive nuclei are immersed in sea of mobile electrons. _____
12. A bond in which two atoms share electrons equally. _____
13. A bond between a metal atom and a nonmetal atom. _____
14. A bond in which one atom transfers electron to another atom. _____

Set B *cont.*

15. One atom in this bond provides both shared electrons. _____
16. A bond in which electronegativity difference between two atoms is 2.0 _____
17. A bond holding atoms in diatomic molecules together. _____
18. Bonding between different nonmetal atoms. _____
19. Bonding between atoms in a molecule. _____
20. Electronegativity difference between two atoms this bond type will be 0.8 _____
21. Bonding resulting from one atom losing and another gaining electrons. _____
22. Bonding resulting from electrostatic attractions between opposite charges. _____
23. Bonding found in polyatomic ions. _____
24. Atoms in a diamond are held together by this bond? _____

Set C: Type of bonding

Objective: To test your ability to determine a type of bond between atoms in a given formula

Indicate which bond type is found between the atoms given or between atoms in the formula given. Use the list of bond types below.

Ionic, polar covalent, nonpolar covalent, coordinate covalent, network solid covalent, metallic

- | | | | |
|----------------------------|-------|-------------------------------------|-------|
| 25. Lithium and Oxygen | _____ | 33. HCl | _____ |
| 26. Aluminum and chlorine | _____ | 34. Na ₂ SO ₄ | _____ |
| 27. Nitrogen and Nitrogen | _____ | 35. Cl ₂ | _____ |
| 28. Carbon and bromine | _____ | 36. Ag | _____ |
| 29. Phosphorous and oxygen | _____ | 37. CCl ₄ | _____ |
| 30. Calcium and fluorine | _____ | 38. SiC | _____ |
| 31. Hydrogen and Hydrogen | _____ | 39. MgF ₂ | _____ |
| 32. Sulfur and oxygen | _____ | 40. LiNO ₃ | _____ |
| | | 41. H ₃ O ⁺ | _____ |

8. Network solids and coordinate covalent bonding: Recalling concept facts and definitions

- The bonding in network solids is
 - 1) Ionic
 - 2) Covalent
 - 3) Metallic
 - 4) Hydrogen
- Substances containing network solid bonding contain
 - 1) Particles that are molecule
 - 2) Particles that are ions
 - 3) Particles that are metallic
 - 4) No discrete particles
- Network solid bonding forms substances that have
 - 1) Low melting points
 - 2) High melting points
 - 3) High electrical conductivity
 - 4) High solubility in water
- A coordinate covalent bonding is formed when
 - 1) An atom transfers one of its electron to a hydrogen ion
 - 2) An atom shares one of its electron with a hydrogen ion
 - 3) An atom transfers two of its electrons to a hydrogen ion
 - 4) An atom shares two of its electron with a hydrogen ion
- A coordinate covalent bond can be form between
 - 1) A hydrogen ion and a hydrogen atom of ammonia molecule
 - 2) A hydrogen ion and a nitrogen atom of ammonia molecule
 - 3) A sodium ion and a hydrogen atom of ammonia molecule
 - 4) A sodium ion and a nitrogen atom of ammonia molecule
- A coordinate covalent bonding will form by interaction between
 - 1) A hydrogen ion and an oxygen atom of a water molecule
 - 2) A hydrogen ion and a hydrogen atom of a water molecule
 - 3) A chlorine ion and an oxygen atom of a water molecule
 - 4) A chlorine ion and a hydrogen atom of a water molecule
- Which two substances can form a coordinate covalent bond with a proton?
 - 1) NH_3 and NH_4^+
 - 2) H_2O and H_3O^+
 - 3) NH_3 and H_2O
 - 4) NH_4^+ and H_3O^+

10. Types of bonding: Determining bond type from bond descriptions

- Which type of bond is formed when electrons are shared between two atoms?
 - 1) Covalent
 - 2) Ionic
 - 3) Metallic
 - 4) Hydrogen
- Which kind of bond is formed between a proton (H^+) and a water molecule?
 - 1) Nonpolar covalent
 - 2) Coordinate covalent
 - 3) Polar
 - 4) Network solid
- Which type of bonding involves positive ions immersed in a sea of mobile electrons?
 - 1) Polar covalent
 - 2) Nonpolar covalent
 - 3) Ionic
 - 4) Metallic
- Atom X loses electrons to atom Y. The bond that is formed between X and Y is best described as
 - 1) Metallic
 - 2) Ionic
 - 3) Covalent
 - 4) Coordinate
- The transfer of electrons from a metal to a nonmetal will result in the formation of
 - 1) Hydrogen bond
 - 2) Covalent bond
 - 3) Ionic bond
 - 4) Metallic bond
- Two atoms with an electronegativity difference of 0.4 form a bond that is
 - 1) Ionic, because electrons are shared
 - 2) Ionic, because electrons are transferred
 - 3) Covalent, because electrons are shared
 - 4) Covalent, because electrons are transferred
- Two atoms share electrons equally, the bond formed is mostly
 - 1) Polar and covalent
 - 2) Ionic and covalent
 - 3) Metallic and covalent
 - 4) Nonpolar and covalent

8. Which type of bond exists in a molecule in which electrons are shared unequally between the two atoms of the molecule?
- 1) A polar covalent bond with an electronegativity difference of zero
 - 2) A polar covalent bond with an electronegativity difference greater than zero
 - 3) A nonpolar covalent bond with an electronegativity difference of zero
 - 4) A nonpolar covalent bond with an electronegativity difference greater than zero
9. When one atom loses one or more electrons to another, the bond formed between the two atoms is best described as
- 1) Ionic with electronegativity difference of greater than 1.7
 - 2) Ionic with electronegativity difference of less than 1.7
 - 3) Covalent with electronegativity difference of greater than 1.7
 - 4) Covalent with electronegativity difference of less than 1.7
10. Atom X bonds with another atom X to form X_2 molecule. The bond in this molecule is
- 1) Polar because electrons are shared equally
 - 2) Nonpolar because electrons are shared equally
 - 3) Polar because electrons are shared unequally
 - 4) Nonpolar because electrons are shared unequally

13. Polar/nonpolar/coordinate/network solid: Determining formulas and names

1. Which formula contains nonpolar covalent bonds?

1) NH_3	2) H_2O	3) O_2	4) $NaCl$
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2. In which formula are the atoms held together by nonpolar covalent bonds?

1) F_2	2) OF_2	3) HF	4) LiF
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3. Which pair of atoms are held together by a nonpolar covalent bond?

1) $Co-Cl$	2) $K-O$	3) $N-H$	4) $N-N$
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4. The bonding in which formula is polar covalent?

1) H_2O	2) H_2	3) O_2	4) Na_2O
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5. Which compound contains atoms held together by polar bonds?

1) $CaCl_2$	2) CO_2	3) O_2	4) Li_2O
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6. Which two atoms are held together by a polar covalent bond?

1) $Br-Cl$	2) $Al-Cl$	3) $Cl-Cl$	4) $Sr-Cl$
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7. In which substance is the bonding network covalent?

1) O_2	2) SiO_2	3) $NaCl$	4) HCl
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8. Which substance contains network solid covalent bonding?

1) H_2O	2) SO_2	3) C	4) Br_2
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9. Coordinate covalent bonding would be found in which species?

1) Hydronium ion	2) Hydrogen ion	3) Oxygen	4) Sodium chloride
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10. Which formula contains atoms held together by a coordinate covalent bond?

1) SiC	2) $CaCl_2$	3) NH_3	4) NH_4^+
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15. Ionic and covalent bonding: Determining formula containing both ionic and covalent

- Which formula contains both ionic and covalent bonds?
1) MgS 2) NaBr 3) $C_6H_{12}O_6$ 4) $MgSO_4$
- Which compound contains atoms that are held together by ionic and covalent bonds?
1) H_2O 2) SiC 3) $NaNO_3$ 4) CH_4
- Which formula contains both ionic and covalent bonds?
1) $Ca(OH)_2$ 2) HCl 3) CH_3OH 4) P_2O_4
- Which compound contains both ionic and covalent bonds?
1) Ammonia 3) Methane
2) Lithium sulfate 4) Potassium chloride
- Which compound has atoms that are held together by both ionic and covalent bonds?
1) Ammonium chloride 3) Sodium Chloride
2) Hydrogen chloride 4) Copper(II) Chloride

17. Types of bond: Determining bond based on atoms in formula or name

- The bonding in calcium phosphate, $Ca_3(PO_4)_2$, can be best described as
1) Covalent, only 3) Ionic, only
2) Both covalent and ionic 4) Neither covalent nor ionic
- Which best describes the bonding in Cl_2 ?
1) Polar and covalent 3) Network solid and covalent
2) Nonpolar and covalent 4) Coordinate and covalent
- Which type of bond is found between the C and H atoms in a molecule of methane, CH_4 ?
1) Covalent bonds 3) Hydrogen bonds
2) Ionic bonds 4) Metallic bonds
- The bonding in a hydronium ion, H_3O^+ is best described as
1) Polar and covalent 3) Network solid and covalent
2) Nonpolar and covalent 4) Coordinate and covalent
- The C – Cl bond in CCl_4 is best described as
1) Ionic, because electrons are transferred 3) Covalent, because electrons are transferred
2) Ionic, because electrons are shared 4) Covalent, because electrons are shared
- Bonding between the two bromine atoms in a bromine molecule is best described as
1) Ionic 3) polar covalent
2) nonpolar covalent 4) Network Covalent
- The transfer of electrons from a sodium atom to a chlorine atom results in the formation of
1) Coordinate covalent bond 3) Nonpolar covalent bond
2) Polar covalent bond 4) Ionic bond
- The carbon atoms in diamond are held together by
1) Metallic bonds 3) Hydrogen bonds
2) Ionic bonds 4) Covalent bonds

9. A bond that holds atoms of nickel together is
- 1) Metallic bond
 - 2) Network covalent bond
 - 3) Ionic bonds
 - 4) Coordinate covalent bond
10. As a bond between a hydrogen atom and a sulfur atom is formed, electrons are
- 1) Shared to form an ionic bond
 - 2) Shared to form a covalent bond
 - 3) Lost and gained to form an ionic bond
 - 4) Lost and gained to form a covalent bond
11. As a bond is formed between atoms of lithium and iodine, electrons are
- 1) Shared to form an ionic bond
 - 2) Shared to form a covalent bond
 - 3) Lost and gained to form an ionic bond
 - 4) Lost and gained to form a covalent bond
12. Bonding in ammonia is best described as
- 1) Covalent
 - 2) Coordinate
 - 3) Ionic
 - 4) Metallic
13. Magnesium nitrate contains chemical bonds that are
- 1) Covalent only
 - 2) Both covalent and ionic
 - 3) Ionic Only
 - 4) Neither covalent nor ionic
14. Bonding between the atoms in a water molecule is
- 1) Nonpolar covalent
 - 2) Polar covalent
 - 3) coordinate covalent
 - 4) Network solid
15. When a reaction occurs between atoms with ground state electron configurations of $2-1$ and $2-7$, the bond formed is mainly
- 1) Polar covalent
 - 2) Metallic
 - 3) Nonpolar covalent
 - 4) Ionic
16. Element magnesium bonds with oxygen to form magnesium oxide, MgO . This bond is mostly
- 1) Ionic, because electrons are shared between Mg and O
 - 2) Ionic, because electrons are transferred from Mg to O
 - 3) Covalent, because electrons are shared between Mg and O
 - 4) Covalent, because electrons are transferred from Mg to O
17. Which type of bond exists in a molecule of hydrogen iodide?
- 1) A polar covalent bond, with an electronegativity difference of zero
 - 2) A polar covalent bond, with an electronegativity difference greater than zero
 - 3) A nonpolar covalent bond, with an electronegativity difference of zero
 - 4) A nonpolar covalent bond, with an electronegativity difference greater than zero
18. Two atoms with ground state electron configurations of $2-8-8-1$ and $2-8-6$ would most likely form a bond that is
- 1) Covalent, because there will be a sharing of electrons
 - 2) Covalent, because there will be a transferring of electrons
 - 3) Ionic, because there will be a sharing of electrons
 - 4) Ionic, because there will be a transferring of electrons
19. An atom with electronegativity of 0.9 bonds with an atom with electronegativity of 3.1. Which phrase best describes the bond between the elements of these atoms?
- 1) Mostly covalent in character, and is formed between two nonmetals
 - 2) Mostly covalent in character, and is formed between a metal and a nonmetal
 - 3) Mostly ionic in character, and is formed between a metal and a nonmetal
 - 4) Mostly ionic in character, and is formed between two nonmetals
20. An element with electronegativity value of 3.5 bonds with an element with electronegativity value of 3.0. Which best describes the bond between these two elements?
- 1) Mostly covalent in character, and is formed between two nonmetals
 - 2) Mostly covalent in character, and is formed between a metal and a nonmetal
 - 3) Mostly ionic in character, and is formed between a metal and a nonmetal
 - 4) Mostly ionic in character, and is formed between two nonmetals