Name: _____
Regents Chemistry
Periodic Table Review Packet

___ 1. Which list of elements consists of a metal, a metalloid, and a nonmetal?

A) Li, Na, Rb B) Cr, Mo, W
C) Sn, Si, C D) O, S, Te

___ 2. The elements on the Periodic Table are arranged in order of increasing

A) atomic mass **B) atomic number**
C) molar mass D) oxidation number

___ 3. Which list includes elements with the most similar chemical properties?

A) Br, Ga, Hg B) Cr, Pb, Xe
C) O, S, Se D) N, O, F

___ 4. The elements in Group 2 are classified as

A) metals B) metalloids
C) nonmetals D) noble gases

___ 5. Which elements have the most similar chemical properties?

A) Si, As, and Te B) N_2, O_2, and F_2
C) Mg, Sr, and Ba D) Ca, Cs, and Cu

___ 6. In the formula XF_2, the element represented by X can be classified as a

A) Group 1 metal
B) Group 2 metal
C) Group 1 nonmetal
D) Group 2 nonmetal

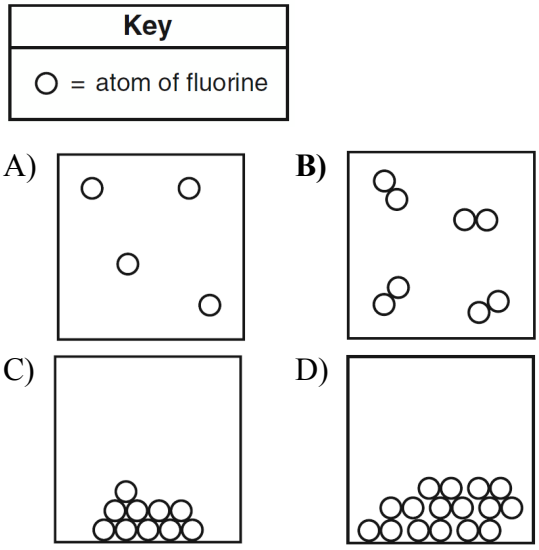
___ 7. A solid element that is malleable, a good conductor of electricity, and reacts with oxygen is classified as a

A) metal B) metalloid
C) noble gas D) nonmetal

___ 8. Which element is a liquid at 305 K and 1.0 atmosphere?

A) magnesium B) fluorine
C) gallium D) iodine

___ 9. Which particle diagram represents the arrangement of F_2 molecules in a sample of fluorine at 95 K and standard pressure?



___ 10. Which element has atoms that can bond to each other in rings and networks?

A) aluminum **B) carbon**
C) hydrogen D) oxygen

___ 11. Which element has chemical properties that are most similar to the chemical properties of fluorine?

A) boron **B) chlorine**
C) neon D) oxygen

___ 12. Which statement explains why neon is a Group 18 element?

A) Neon is a gas at STP.
B) Neon has a low melting point.
C) Neon atoms have a stable valence electron configuration.
D) Neon atoms have two electrons in the first shell.

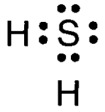
13. At STP, both diamond and graphite are solids composed of carbon atoms. These solids have

A) the same crystal structure and the same properties
B) the same crystal structure and different properties
C) different crystal structures and the same properties
D) different crystal structures and different properties

14. Which Lewis electron-dot diagram represents a nitrogen atom in the ground state?

A) 
B) 
C) 
D) 

15. Which Lewis electron-dot diagram represents a molecule having a nonpolar covalent bond?

A) 
B) 
C) 
D) 

16. In the ground state, which atom has a completely filled valence electron shell?

A) C B) V **C) Ne** D) Sb

17. Which ion has *no* electrons?

A) H^+ B) Li^+ C) Na^+ D) Rb^+

18. What is the total number of valence electrons in a germanium atom in the ground state?

A) 22 B) 2 C) 32 **D) 4**

19. Which atom attains a stable valence electron configuration by bonding with another atom?

A) neon B) radon
C) helium **D) hydrogen**

20. An ionic bond can be formed when one or more electrons are

A) equally shared by two atoms
B) unequally shared by two atoms
C) transferred from the nucleus of one atom to the nucleus of another atom
D) transferred from the valence shell of one atom to the valence shell of another atom

21. As the elements is Period 3 are considered in order of increasing atomic number, there is a general *decrease* in

A) atomic mass
B) atomic radius
C) electronegativity
D) first ionization energy

22. Which atom has the *weakest* attraction for electrons in a chemical bond?

A) a boron atom **B) a calcium atom**
C) a fluorine atom D) a nitrogen atom

23. Which general trend is found in Period 3 as the elements are considered in order of increasing atomic number?

A) increasing atomic radius
B) increasing electronegativity
C) decreasing atomic mass
D) decreasing first ionization energy

24. Which atom in the ground state requires the *least amount of energy to remove its valence electron?*

A) lithium atom B) potassium atom
C) rubidium atom D) sodium atom

Base your answers to questions **25** through **28** on the information below and on your knowledge of chemistry.

Before atomic numbers were known, Mendeleev developed a classification system for the 63 elements known in 1872, using oxide formulas and atomic masses. He used an R in the oxide formulas to represent any element in each group. The atomic mass was listed in parentheses after the symbol of each element. A modified version of Mendeleev's classification system is shown in the table below.

Modified Version of Mendeleev's Table

Group →		I	II	III	IV	V	VI	VII
Oxide formulas		R_2O	RO	R_2O_3	RO_2	R_2O_5	RO_3	R_2O_7
Series	1	H(1)						
	2	Li(7)	Be(9.4)	B(11)	C(12)	N(14)	O(16)	F(19)
	3	Na(23)	Mg(24)	Al(27.3)	Si(28)	P(31)	S(32)	Cl(35.5)
	4	K(39)	Ca(40)		Ti(48)	V(51)	Cr(52)	Mn(55)
	5	Cu(63)	Zn(65)			As(75)	Se(78)	Br(80)
	6	Rb(85)	Sr(87)	Yt(88)	Zr(90)	Nb(94)	Mo(96)	
	7	Ag(108)	Cd(112)	In(113)	Sn(118)	Sb(122)	Te(125)	I(127)
	8	Cs(133)	Ba(137)	Di(138)	Ce(140)			

___ 25. Explain , in terms of chemical reactivity, why the elements in Group 18 on the modern Periodic Table were *not* identified by Mendeleev at that time.

___ 26. Based on Mendeleev's oxide formula, what is the number of electrons lost by each atom of the elements in Group III?

___ 27. Identify *one* characteristic used by Mendeleev to develop his classification system of the elements.

___ 28. Based on Table *J*, identify the *least* active metal listed in Group I on Mendeleev's table.

Base your answers to questions **29** and **30** on the information below and on your knowledge of chemistry.

When magnesium is ignited in air, the magnesium reacts with oxygen and nitrogen. The reaction between magnesium and nitrogen is represented by the unbalanced equation below:

$Mg(s) + N_2(g) \rightarrow Mg_3N_2(s)$

___ 29. Explain, in terms of electrons, why an atom of the metal in this reaction forms an ion that has a smaller radius than its atom.

___ 30. In the ground state, which noble gas has atoms with the same electron configuration as a magnesium ion?

___ 31. Draw a Lewis electron-dot diagram for an atom of silicon.

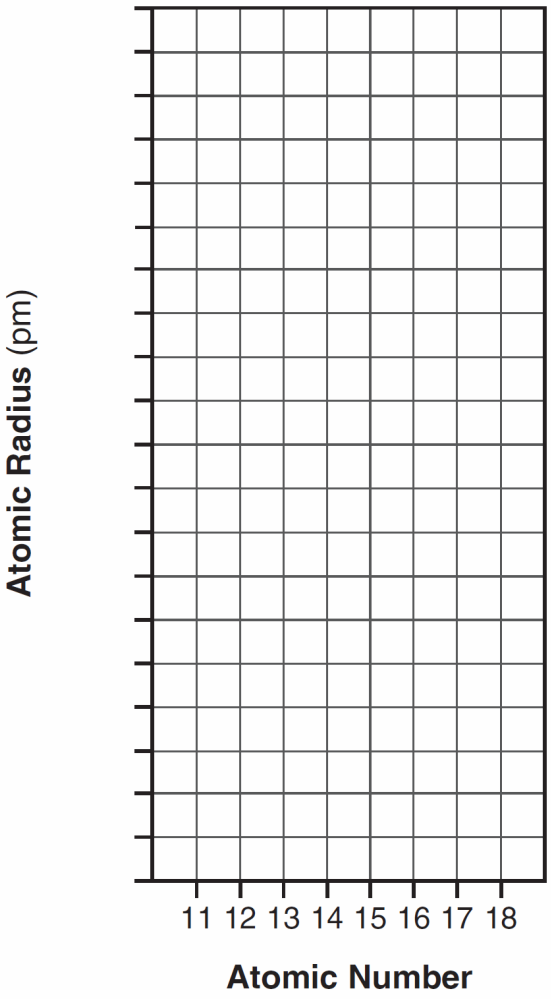
Base your answers to questions **32** through **34** on the information below.

The atomic number and corresponding atomic radius of the Period 3 elements are shown in the data table below.

Data Table

Atomic Number	**Atomic Radius** (pm)
11	160.
12	140.
13	124
14	114
15	109
16	104
17	100.
18	101

Atomic Radius Versus Atomic Number



___ 32. State the general relationship between the atomic number and the atomic radius for the Period 3 elements.

___ 33. Explain, in terms of electrons, the change in radius when a sodium atom becomes a sodium ion.

___ 34. On the grid above, plot the data from the data table. Circle and connect the points.

Answer Key
Periodic Table Review Packet

1. **C**
2. **B**
3. **C**
4. **A**
5. **C**
6. **B**
7. **A**
8. **C**
9. **B**
10. **B**
11. **B**
12. **C**
13. **D**
14. **C**
15. **A**
16. **C**
17. **A**
18. **D**
19. **D**
20. **D**
21. **B**
22. **B**
23. **B**
24. **C**
25. –Since the Group 18 elements tend not to react with other elements, there were no oxide compounds for Mendeleev to study. –Group 18 elements are generally unreactive.
26. –three electrons –three –3
27. –increasing atomic mass –atomic mass –oxide formulas
28. –Ag –silver
29. – An atom of magnesium loses its outer shell electrons to form the Mg^{2+} ion. – The electron configuration of a magnesium atom is 2-8-2, and the electron configuration of the magnesium ion is 2-8. – An atom of the metal loses electrons to form the ion.
30. Ne *or* neon
31. 
32. As atomic number increases, there is a decrease in atomic radius
33. –The radius of a sodium ion is smaller because the sodium atom lost one electron. –An Na^+ ion is smaller because it has one fewer electron shell.
34.