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

   A) boiling point B) electronegativity
   C) atomic number D) atomic mass

2. Which element has chemical properties that are most similar to those of calcium?

   A) Co B) K C) N **D) Sr**

3. Which list of elements contains a metal, a metalloid, and a nonmetal?

   A) Zn, Ga, Ge B) Si, Ge, Sn
   C) Cd, Sb, I D) F, Cl, Br

4. Which element is malleable and can conduct electricity in the solid phase?

   A) iodine B) phosphorus
   C) sulfur **D) tin**

5. The element in Period 4 and Group 1 of the Periodic Table would be classified as a

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

6. At STP, an element that is a brittle solid and a poor conductor of heat and electricity could have an atomic number of

   A) 12 B) 13 **C) 16** D) 17

7. In which area of the Periodic Table are the elements with the strongest nonmetallic properties located?

   A) lower left B) upper left
   C) lower right **D) upper right**

8. Which element is a noble gas?

   A) W **B) Ar** C) N D) Er

9. Which element exists as monatomic molecules at STP?

   A) hydrogen B) nitrogen
   C) argon D) chlorine

10. Which isotopic notation identifies a metalloid that is matched with the corresponding number of protons in each of its atoms?

    A) ^{24}Mg and 12 protons
    B) ^{28}Si and 14 protons
    C) ^{75}As and 75 protons
    D) ^{80}Br and 80 protons

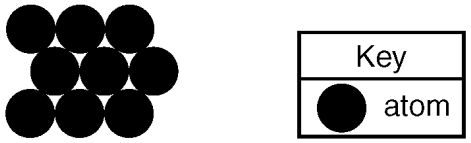
11. Pure silicon is chemically classified as a metalloid because silicon

    A) is malleable and ductile
    B) is an excellent conductor of heat and electricity
    C) exhibits metallic and nonmetallic properties
    D) none of the above

12. Which element is a solid at STP and a good conductor of electricity?

    A) iodine B) mercury
    C) nickel D) sulfur

13. Given the particle diagram:



    At 101.3 kPa and 298 K, which element could this diagram represent?

    A) Rn B) Xe **C) Ag** D) Kr

14. Which statement explains why ozone gas, O_3, and oxygen gas, O_2, have different properties?

    A) They are formed from different elements.
    B) They have different molecular structures.
    C) They have different oxidation numbers.
    D) They have different electronegativities.

15. Which Lewis electron-dot diagram represents a boron atom in the ground state?

    A) ·B **B)** ·B· C) :B· D) :B·

16. An atom of argon rarely bonds to an atom of another element because an argon atom has

    A) 8 valence electrons
    B) 2 electrons in the first shell
    C) 3 electron shells
    D) 22 neutrons

17. How many electrons are in an Fe^{2+} ion

    A) 24 B) 26 C) 28 D) 56

18. Aqueous solutions of compounds containing element *X* are blue. Element *X* could be

    A) carbon **B) copper**
    C) sodium D) sulfur

19. Which physical characteristic of a solution may indicate the presence of a transition element?

    A) its density
    B) its color
    C) its effect on litmus
    D) the effect on phenolphthalein

20. When an atom loses one or more electrons, this atom becomes a

    A) positive ion with a radius smaller than the radius of this atom
    B) positive ion with a radius larger than the radius of this atom
    C) negative ion with a radius smaller than the radius of this atom
    D) negative ion with a radius larger than the radius of this atom

21. How do the atomic radius and metallic properties of sodium compare to the atomic radius and metallic properties of phosphorus?

    A) Sodium has a larger atomic radius and is more metallic.
    B) Sodium has a larger atomic radius and is less metallic.
    C) Sodium has a smaller atomic radius and is more metallic.
    D) Sodium has a smaller atomic radius and is less metallic.

22. As the elements in Period 2 of the Periodic Table are considered in succession from left to right, there is a decrease in atomic radius with increasing atomic number. This may best be explained by the fact that the

    A) number of protons increases, and the number of shells of electrons remains the same
    B) number of protons increases, and the number of shells of electrons increases
    C) number of protons decreases, and the number of shells of electrons remains the same
    D) number of protons decreases, and the number of shells of electrons increases

23. When an atom of phosphorus becomes a phosphide ion (P^{3-}), the radius

    A) decreases B) increases
    C) remains the same

24. Based on Reference Table S, atoms of which of these elements have the strongest attraction for the electrons in a chemical bond?

    A) Al B) Si C) P **D) S**

25. Which trends appear as the elements in Period 3 are considered from left to right?

    A) Metallic character decreases, and electronegativity decreases.
    B) Metallic character decreases, and electronegativity increases.
    C) Metallic character increases, and electronegativity decreases.
    D) Metallic character increases, and electronegativity increases.

26. Which sequence correctly places the elements in order of increasing ionization energy?

    A) $H \rightarrow Li \rightarrow Na \rightarrow K$
    B) $I \rightarrow Br \rightarrow Cl \rightarrow F$
    C) $O \rightarrow S \rightarrow Se \rightarrow Te$
    D) $H \rightarrow Be \rightarrow Al \rightarrow Ga$

27. How much energy is required to remove the most loosely bound electron from a neutral atom of carbon in the gaseous phase?

    A) 363 kJ B) 441 kJ
    C) 1086 kJ D) 1242 kJ

28. As the atoms of the Group 17 elements in the ground state are considered from top to bottom, each successive element has

    A) the same number of valence electrons and similar chemical properties
    B) the same number of valence electrons and identical chemical properties
    C) an increasing number of valence electrons and similar chemical properties
    D) an increasing number of valence electrons and identical chemical properties

29. Base your answer to the following question on the information below.

Elements with atomic numbers 112 and 114 have been produced and their IUPAC names are pending approval. However, an element that would be put between these two elements on the Periodic Table has not yet been produced. If produced, this element will be identified by the symbol Uut until an IUPAC name is approved.

Identify one element that would be chemically similar to Uut.

Base your answers to questions **30** and **31** on the information below.

A metal, *M*, was obtained from a compound in a rock sample. Experiments have determined that the element is a member of Group 2 on the Periodic Table of the Elements.

30. Explain why the radius of a positive ion of element *M* is *smaller* than the radius of an atom of element *M*.

31. Explain, in terms of electrons, why element *M* is a good conductor of electricity.

32. Base your answer to the following question on the table below.

First Ionization Energy of Selected Elements

Element	Atomic Number	First Ionization Energy (kJ/mol)
lithium	3	520
sodium	11	496
potassium	19	419
rubidium	37	403
cesium	55	376

Explain, in terms of atomic structure, why cesium has a *lower* first ionization energy than rubidium.

Answer Key
Do Now Unit 4 Periodic Table

1. **C**
2. **D**
3. **C**
4. **D**
5. **A**
6. **C**
7. **D**
8. **B**
9. **C**
10. **B**
11. **C**
12. **C**
13. **C**
14. **B**
15. **B**
16. **A**
17. **A**
18. **B**
19. **B**
20. **A**
21. **A**
22. **A**
23. **A**
24. **D**
25. **B**
26. **B**
27. **C**
28. **A**
29. *Examples:* – Ti – boron
30. Examples: – The ionic radius is smaller because the atom loses two electrons. – The ion has one less occupied energy level.
31. Examples: – Metals have freely moving valence electrons. – mobile valence electrons – sea of mobile electrons – Electrons are delocalized.
32. Acceptable responses include, but are not limited to:
As atomic radius increases, valence electrons are more easily removed.
The force of attraction between the nucleus and the valence electrons decreases down the group.
cesium has more shells, easier to remove electrons