

Name: _____

- Which two characteristics are associated with metals?
(1) low first ionization energy and low electronegativity
(2) low first ionization energy and high electronegativity
(3) high first ionization energy and low electronegativity
(4) high first ionization energy and high electronegativity
- Which element is most chemically similar to chlorine?
(1) Ar (2) F (3) Fr (4) S
- At STP, which element is brittle and *not* a conductor of electricity?
(1) S (2) K (3) Na (4) Ar

Base your answers to questions 4 through 7 on the information below.

The table below lists physical and chemical properties of six elements at standard pressure that correspond to known elements on the Periodic Table. The elements are identified by the code letters, D, E, G, J, L, and Q.

Properties of Six Elements at Standard Pressure

<u>Element D</u> Density 0.00018 g/cm ³ Melting point -272°C Boiling point -269°C Oxide formula (none)	<u>Element E</u> Density 1.82 g/cm ³ Melting point 44°C Boiling point 280°C Oxide formula E ₂ O ₅	<u>Element G</u> Density 0.53 g/cm ³ Melting point 181°C Boiling point 1347°C Oxide formula G ₂ O
<u>Element J</u> Density 0.0013 g/cm ³ Melting point -210°C Boiling point -196°C Oxide formula J ₂ O ₅	<u>Element L</u> Density 0.86 g/cm ³ Melting point 64°C Boiling point 774°C Oxide formula L ₂ O	<u>Element Q</u> Density 0.97 g/cm ³ Melting point 98°C Boiling point 883°C Oxide formula Q ₂ O

4. What is the total number of elements in the "Properties of Six Elements at Standard Pressure" table that are solids at STP?

5. An atom of element G is in the ground state. What is the total number of valence electrons in this atom?

Letter Z corresponds to an element on the Periodic Table other than the six listed elements. Elements G, Q, L, and Z are in the same group on the Periodic Table, as shown in the diagram below.

G
Q
L
Z

6. Based on the trend in the melting points for elements G, Q, and L listed in the "Properties of Six Elements at Standard Pressure" table, estimate the melting point of element Z, in degrees Celsius.

7. Identify, by code letter, the element that is a noble gas in the "Properties of Six Elements at Standard Pressure" table.

- Which element is a solid at STP and a good conductor of electricity?
(1) iodine (2) mercury (3) nickel (4) sulfur
- Which element has both metallic and nonmetallic properties?
(1) Rb (2) Rn (3) Si (4) Sr
- The carbon atoms in graphite and the carbon atoms in diamond have different
(1) atomic numbers (2) atomic masses (3) electronegativities (4) structural arrangements

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11. ____ Atoms of which element have the greatest tendency to gain electrons?
(1) bromine (2) chlorine (3) fluorine (4) iodine
12. ____ Which statement describes a chemical property of the element magnesium?
(1) Magnesium is malleable. (3) Magnesium reacts with an acid.
(2) Magnesium conducts electricity. (4) Magnesium has a high boiling point.
13. ____ Which statement explains why sulfur is classified as a Group 16 element?
(1) A sulfur atom has 6 valence electrons. (3) Sulfur is a yellow solid at STP.
(2) A sulfur atom has 16 neutrons. (4) Sulfur reacts with most metals.
14. ____ How do the atomic radius and metallic properties of sodium compare to the atomic radius and metallic properties of phosphorus?
(1) Sodium has a larger atomic radius and is more metallic.
(2) Sodium has a larger atomic radius and is less metallic.
(3) Sodium has a smaller atomic radius and is more metallic.
(4) Sodium has a smaller atomic radius and is less metallic.

Base your answers to questions 15 through 17 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.

15. In the space provided, draw a Lewis electron-dot diagram for an atom of Uut.

16. Determine the charge of an Uut nucleus. Your response must include *both* the numerical value and the sign of the charge.

17. Identify *one* element that would be chemically similar to Uut.

18. ____ Sodium atoms, potassium atoms, and cesium atoms have the same
(1) atomic radius (3) total number of protons
(2) first ionization energy (4) oxidation state

19. ____ Which statement describes a chemical property of hydrogen gas?
(1) Hydrogen gas burns in air. (3) Hydrogen gas has a density of 0.000 09 g/cm³ at STP.
(2) Hydrogen gas is colorless. (4) Hydrogen gas has a boiling point of 20. K at standard pressure.

20. ____ Which element has the greatest density at STP?
(1) calcium (2) carbon (3) chlorine (4) copper

21. ____ Which list of elements consists of metalloids, only?
(1) B, Al, Ga (2) C, N, P (3) O, S, Se (4) Si, Ge, As

22. ____ Which general trend is found in Period 2 on the Periodic Table as the elements are considered in order of increasing atomic number?
(1) decreasing atomic mass (3) increasing atomic radius
(2) decreasing electronegativity (4) increasing first ionization energy

23. Describe *one* chemical property of Group 1 metals that results from the atoms of each metal having only one valence electron.