

- Which of the following elements would be considered a alkali metal?
A. Cs B. Sr C. Zr D. As E. Xe
- The substances, nitrogen, chlorine, and krypton are all _____.
A. halogens
B. noble gases
C. nonmetals
D. compounds
E. ions
- Which of the following elements should have chemical properties most similar to calcium?
A. cadmium
B. scandium
C. potassium
D. manganese
E. magnesium
- Which of the following is incorrectly paired?

	<u>Name</u>	<u>Symbol</u>
A.	Tin	Sn
B.	Potassium	K
C.	Manganese	Mg
D.	Arsenic	As
E.	All of these are correctly paired	
- Metals are elements which _____.
A. tend to be malleable
B. tend to lose electrons to form cations
C. tend to be poor conductors of heat
D. Both A and B
E. A, B, and C
- What scientist is most closely associated with the Plum Pudding Model of the atom?
A. Democritus
B. Dalton
C. Thomson
D. Rutherford
E. Boyle
- An ion is formed
A. by an atom either gaining or losing protons.
B. by an atom either gaining or losing electrons.
C. by an atom either gaining or losing neutrons.
D. two of the above are true
E. A, B, and C are all true.

8. _____ is the smallest unit of matter that can represent a compound.
- A. an atom
 - B. a molecule
 - C. an ion
 - D. a proton
 - E. a mole
9. Which of the following best indicates a chemical change?
- A. a substance changes shape
 - B. a substance changes composition
 - C. a substance changes temperature
 - D. a substance changes color
 - E. a substance changes states (of matter)
10. How many significant figures are represented by the measurement, 0.00320 grams.
- A. two
 - B. three
 - C. four
 - D. five
 - E. six
11. What scientist is most closely associated with discovering the nucleus of an atom?
- A. Rutherford
 - B. Dalton
 - C. Thomson
 - D. Chadwick
 - E. Millikan
12. Which of the following represents a physical property?
- A. Lead has a density of 11.4 g/mL.
 - B. Nitrogen has a boiling point of 77 K.
 - C. Iron rusts when heated in moist air.
 - D. Both A and B
 - E. All of these
13. A sample of sugar (50.1 grams) and a sample of water (62.5 grams) are mixed to make a solution. How many significant figures should be used to report the total mass of the solution?
- A. one
 - B. two
 - C. three
 - D. four
 - E. five

14. 201 g = _____ mg
- A. 0.201
 - B. 2.01
 - C. 2.01×10^3
 - D. 2.01×10^5
 - E. 2.01×10^8
15. Which of the following is the largest mass of sample
- A. 0.00125 kilograms
 - B. 1250. milligrams
 - C. 125. centigrams
 - D. 12.5 grams
 - E. 1250. micrograms
16. 13.1 cm = _____ ym (ym = “yoctometer” = 10^{-24} m)
- A. 1.31×10^{-27}
 - B. 1.31×10^{-25}
 - C. 1.31×10^{23}
 - D. 1.31×10^{25}
 - E. 1.31×10^{27}
17. A Sabbath Day’s Journey in the Old Testament might be described as a distance of 2000 cubits. Using the conversion factors below, determine the distance in miles that is equivalent to a Sabbath Day’s Journey:
- 1 cubit = 17.5 in 1 foot = 12 in 1 mile = 5280 ft
- A. 0.26 mile
 - B. 0.38 mile
 - C. 0.55 mile
 - D. 0.72 mile
 - E. 1.8 miles
18. How many neutrons are in an atom of the isotope, iron-57?
- A. 57
 - B. 26
 - C. 27
 - D. 31
 - E. 22

19. A cube of Frazium is 1.25 inches per side and has a mass of 0.325 kg. What is Frazium's density in g/mL?
- A. 1.81×10^1 g/mL
 - B. 2.60×10^2 g/mL
 - C. 1.98×10^1 g/mL
 - D. 1.67×10^2 g/mL
 - E. 1.02×10^1 g/mL
20. A very concentrated solution of hydrochloric acid and water is determined to be 37.2%(w/w) hydrochloric acid. If this solution has a density of 1.19 g/mL, what volume (mL) of solution would contain 50.0 grams of hydrochloric acid?
- A. 160. mL
 - B. 113. mL
 - C. 22.1 mL
 - D. 42.0 mL
 - E. 134. mL
21. When Dr. Bryan was a young boy (long ago!) the engine displacement in a 1964 Ford Mustang was about 290 in³ ("cubic inches"). Today's engine displacements are measured in Liters. What is the engine displacement of a 1964 Mustang in Liters?
- A. about 1 Liter
 - B. about 3 Liters
 - C. about 4 Liters
 - D. about 5 Liters
 - E. about 6 Liters
22. A vitamin tablet has a mass of 1.8799 grams. The label says that it contains 600. mg of calcium, 40. mg of magnesium, and 7.5 mg of zinc. The rest of the tablet's mass is composed of trace elements and an inert binder. What is the percent by weight (w/w) of zinc in the tablet?
- A. 6.2 %(w/w)
 - B. 0.40 %(w/w)
 - C. 1.2 %(w/w)
 - D. 2.1 %(w/w)
 - E. 34. %(w/w)

23. At an alchemist's desk, melted gold drips into a pot at 3.12 mL/min. How many grams of gold will drip into the pot in 1.50 hours? (Density of Gold = 19.3 g/mL)
- A. 7.45×10^1 g
B. 3.61×10^3 g
C. 5.42×10^3 g
D. 5.57×10^2 g
E. 2.81×10^2 g
24. How many electrons are in ${}^{59}_{27}\text{Co}^{3+}$?
- A. 24 B. 27 C. 29 D. 30 E. 32
25. Which of the following is incorrectly paired?
- | | <u>Name</u> | <u>Symbol</u> |
|----|-----------------------------------|--------------------|
| A. | sulfate ion | SO_4^{2-} |
| B. | phosphate ion | PO_4^{3-} |
| C. | oxide ion | O^{2-} |
| D. | nitrite ion | NO_3^- |
| E. | all of these are correctly paired | |
26. The smallest division (i.e. graduation mark) on a very sensitive thermometer is 0.01 °C. Which of the readings below would represent a temperature reported to the correct number of significant figures using this thermometer?
- A. 25 °C. B. 18.1 C. C. 24.15 °C. D. 16.235 °C. E. 10.2358 °C.
27. Which one of the following statements about atomic structure is false?
- A. The electrons occupy a very large volume compared to the nucleus.
B. Almost all the mass of the atom is concentrated in the nucleus.
C. The protons and neutrons in the nucleus are very tightly packed.
D. The number of protons is always the same for atoms of a given element.
E. All of the above statements are true.