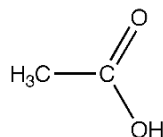


Identify the choice that best completes the statement or answers the question.

- How many protons, neutrons, and electrons are in a hydrogen-2 (^2H) atom?
 - 1 proton, 1 neutron, 1 electron
 - 1 proton, 3 neutrons, 1 electron
 - 2 protons, 1 neutron, 2 electrons
 - 2 protons, 1 neutron, 1 electron
 - 1 proton, 2 neutrons, 1 electron
- What is the atomic symbol for an element with 37 protons and 48 neutrons?
 - $^{226}_{88}\text{Ra}$
 - $^{88}_{12}\text{Mg}$
 - $^{88}_{50}\text{Sn}$
 - $^{88}_{38}\text{Sr}$
 - $^{85}_{37}\text{Rb}$
- Which atom is most likely to form a 1- ion?
 - K
 - P
 - Mg
 - F
 - Ar
- Which atom is most likely to form a 2+ ion?
 - Sc
 - F
 - S
 - Sr
 - Ga
- Identify the ions in CaHPO_4 .
 - Ca^{3+} and HPO_4^{3-}
 - Ca^{2+} , H^+ , P^{3-} , and O^{2-}
 - Ca^{2+} and HPO_4^{2-}
 - Ca^{2+} and PO_4^{3-}
 - Ca^+ and HPO_4^-
- What is the correct formula for potassium hydrogen carbonate?
 - KH_2CO_3
 - K_2CO_3
 - KCO_3
 - KHCO_3
 - K_2HCO_3
- Predict which ionic compound has the highest melting point.
 - CaBr_2
 - RbI
 - CsCl
 - MgO
 - KBr
- What is the mass of 0.018 mol Mg?
 - 1.4×10^3 g
 - 2.3 g
 - 7.4×10^{-4} g
 - 0.44 g
 - 4.0×10^{-23} g
- The molar mass of platinum is 195.08 g/mol. What is the mass of 1.00×10^2 Pt atoms?
 - 3.24×10^{-24} g
 - 3.24×10^{-22} g
 - 3.24×10^{-20} g
 - 1.67×10^{-22} g
 - 8.51×10^{-25} g
- What mass of Ba contains the same number of atoms as 3.0 g Li?
 - 2.9×10^3 g
 - 0.0031 g
 - 59 g
 - 0.15 g
 - 3.0 g

11. What is the mass percent of each element in sulfuric acid, H_2SO_4 ?
- 2.016% H, 32.07% S, 65.91% O
 - 1.028% H, 32.69% S, 66.28% O
 - 2.055% H, 32.69% S, 65.25% O
 - 1.028% H, 33.72% S, 65.25% O
 - 28.57% H, 14.29% S, 57.17% O
12. An ionic compound has the formula MCl_2 . The mass of 0.3011 mol of the compound is 40.48 grams. What is the identity of the metal **M**?
- Sn
 - Hg
 - Ba
 - Cu
 - Ni
13. What is the charge of the most common ion formed from Br?
- +1
 - 2
 - +2
 - 0
 - 1



14. The correct molecular formula for the molecule at right is
- $\text{C}_2\text{O}_2\text{H}_4$
 - $\text{C}_2\text{O}_2\text{H}_3$
 - C_2OH_4
 - $\text{C}_2\text{O}_2\text{H}_3$
 - CO_2H_4
15. The equation at right yields a result in what units?
- $$\frac{(kg \cdot m^2 \cdot s^{-2})(s)}{g \cdot m \cdot s^{-1}}$$
- velocity
 - distance
 - time
 - density
 - mass
16. Magnesium reacts with chlorine gas to produce magnesium chloride. How many moles of Mg will react with 2.6 moles of Cl_2 ?
- 3.9 mol
 - 1.3 mol
 - 2.6 mol
 - 7.8 mol
 - 5.2 mol
17. An argon ion laser emits light at 457.9 nm. What is the frequency of this radiation?
- $1.527 \times 10^{-15} \text{ s}^{-1}$
 - $2.305 \times 10^{18} \text{ s}^{-1}$
 - $1.373 \times 10^{11} \text{ s}^{-1}$
 - $4.338 \times 10^{-19} \text{ s}^{-1}$
 - $6.547 \times 10^{14} \text{ s}^{-1}$
18. The ____ of a photon of light is ____ proportional to its frequency and ____ proportional to its wavelength.
- energy, inversely, directly
 - intensity, inversely, directly
 - amplitude, directly, inversely
 - energy, directly, inversely
 - velocity, directly, inversely

19. What is the energy (in kJ) of 1.00 mole of photons of green light with a wavelength of 507 nm?
a. 91.6 kJ b. 60.7 kJ c. 236 kJ d. 4.24 kJ e. 152 kJ
20. The energy required to break one mole of hydrogen-hydrogen bonds in H₂ is 436 kJ/mol. What is the longest wavelength of light capable of breaking a single hydrogen-hydrogen bond?
a. 688 nm b. 132 nm c. 0.688 nm d. 274 nm e. 119 nm
21. For a hydrogen atom, calculate the energy of a photon in the Balmer series that results from the transition $n = 3$ to $n = 2$. The Rydberg constant is $1.0974 \times 10^7 \text{ m}^{-1}$. ($h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$ and $c = 2.998 \times 10^8 \text{ m/s}$)
a. $3.63 \times 10^{-19} \text{ J}$ c. $3.03 \times 10^{-19} \text{ J}$ e. $4.36 \times 10^{-19} \text{ J}$
b. $2.18 \times 10^{-18} \text{ J}$ d. $1.09 \times 10^{-17} \text{ J}$
22. All of the following sets of quantum numbers are allowed EXCEPT
a. $n = 6, \ell = 2, m_\ell = +3$ d. $n = 4, \ell = 3, m_\ell = -1$
b. $n = 1, \ell = 0, m_\ell = 0$ e. $n = 5, \ell = 1, m_\ell = 0$
c. $n = 3, \ell = 2, m_\ell = +2$
23. What type of orbital is designated $n = 4, \ell = 0, m_\ell = 0$?
a. $4f$ b. $4p$ c. $4d$ d. $4s$ e. none
24. When ethanol undergoes complete combustion, the products are carbon dioxide and water.
 $__ \text{C}_2\text{H}_5\text{OH}(\ell) + __ \text{O}_2(\text{g}) \rightarrow __ \text{CO}_2(\text{g}) + __ \text{H}_2\text{O}(\text{g})$
What are the respective coefficients when the equation is balanced with the smallest whole numbers?
a. 1, 2, 1, 3 d. 1, 3, 2, 3
b. 2, 3, 4, 6 e. 1, 1, 1, 1
c. 2, 7, 4, 6
25. Which is the name and number of this course?
a. Chem 365 c. Bio 100 e. Chem 0
b. Basket Weaving 101 d. Chem 111

Answer Key

1.	A	2.2 Atomic Number and Atomic Mass	
2.	E	2.2 Atomic Number and Atomic Mass	
3.	D	2.7 Ionic Compounds: Formulas, Names, and Properties	
4.	D	2.7 Ionic Compounds: Formulas, Names, and Properties	
5.	C	2.7 Ionic Compounds: Formulas, Names, and Properties	
6.	D	2.7 Ionic Compounds: Formulas, Names, and Properties	
7.	D	2.7 Ionic Compounds: Formulas, Names, and Properties	
8.	D	2.9 Atoms, Molecules, and the Mole	
9.	C	2.9 Atoms, Molecules, and the Mole	
10.	C	2.9 Atoms, Molecules, and the Mole	
11.	C	2.10 Describing Compound Formulas	
12.	D	2.10 Describing Compound Formulas	
13.	E	2.7 Ionic Compounds: Formulas, Names, and Properties	
14.	A		
15.	B		
16.	C	4.1 Mass Relationships in Chemical Reactions: Stoichiometry	
17.	E	6.1 Electromagnetic Radiation	
18.	D	6.2 Planck, Einstein, Energy, and Photons	
19.	C	6.2 Planck, Einstein, Energy, and Photons	
20.	D	6.2 Planck, Einstein, Energy, and Photons	
21.	C	6.3 Atomic Line Spectra and Niels Bohr	
22.	A	6.5 The Modern View of Electronic Structure: Wave or Quantum Mechanics	
23.	D	6.6 The Shapes of Atomic Orbitals	
24.	D	3.2 Balancing Chemical Equations	
25.	D		