

ALCHEMY
PRACTICE: UNIT EXAM

Name _____
Date _____ Period _____

Part I: Multiple Choice Write the letter of the correct answer.

- _____ 1. What type of bonding is found in zinc, Zn (s)?
(A) ionic (B) metallic (C) covalent network (D) molecular covalent
- _____ 2. Which atom has 8 valence electrons and 2 core electrons?
(A) Be (B) O
(C) Ne (D) C
- _____ 3. What element has the following electron configuration: [Ar] 4s² 3d³
(A) P (B) Ti (C) V (D) Al
- _____ 4. In an isotope notation, the number to the upper left of the element symbol represents the
(A) the atomic number (B) number of protons
(C) mass of neutrons (D) mass number
- _____ 5. Which part of an atom has a negative charge?
(A) proton (B) neutron (C) electron (D) valence electron
- _____ 6. When an isotope is created, the number of _____ are not changed in the atom.
(A) protons (B) electrons (C) neutrons (D) alpha particles.
- _____ 7. Which elements would you expect to have similar properties?
(A) C and Si (B) Cu and Zn (C) N and O (D) H and He
- _____ 8. Which of the following is a transition metal?
(A) Br (B) Ba (C) Sn (D) Pt
- _____ 9. Which of the following is a nonmetal?
(A) H (B) W (C) Cs (D) Hg
- _____ 10. When a substance is dissolved in water, what kind of compound will conduct electricity?
(A) metallic (B) ionic (C) molecular covalent (D) covalent network
- _____ 11. Which of the following will NOT form?
(A) Na₂O (B) AlCl₃ (C) NaCl (D) Ca₂Na
- _____ 12. The Group VIIIA elements are called
(A) alkali metals (B) alkaline earth metals
(C) noble gases (D) halogens

- _____ 13. The number of protons in a Ni atom is
(A) 23 (B) 27 (C) 28 (D) 51
- _____ 14. The number of neutrons most likely to be found in a xenon atom.
(A) 54 (B) 78 (C) 77 (D) 79
- _____ 15. The number of valence electrons in a phosphorous atom.
(A) 15 (B) 5 (C) 3 (D) 31
- _____ 16. The subshell which can be occupied by a maximum of 14 electrons is identified by the letter
(A) s (B) p (C) d (D) f
- _____ 17. What element has the following electron configuration: $[\text{Ne}]3s^23p^2$?
(A) Si (B) C (C) C (D) Al
- _____ 18. The color of flame produced when a sample of potassium chloride is burned.
(A) red (B) blue/green (C) yellow/orange (D) pink/lilac
- _____ 19. How many milliliters are in 1 meter?
(A) 10 (B) 100
(C) 1000 (D) 10000
- _____ 20. Isotopes of carbon have different
(A) atomic numbers. (B) atomic masses.
(C) numbers of electrons. (D) numbers of protons
- _____ 21. Which of the following is a phosphate ion?
(A) PO_3^- (B) PO_3^{2-} (C) PO_4^{3-} (D) PO_4^-
- _____ 22. Which of the following will NOT dissolve in water?
(A) Al (s) (B) CaO (s) (C) CuCl_2 (s) (D) LiF (s)
- _____ 23. What type of bonding is found in zinc chloride, ZnCl_2 (s)?
(A) ionic (B) metallic (C) covalent network (D) molecular covalent
- _____ 24. When a sulfur atom forms an ion, its charge will be
(A) 1+ (B) 2+ (C) 2- (D) 1-
- _____ 25. The correct formula for calcium nitride is
(A) CaN_3 (B) Ca_3N_2 (C) CaN (D) Ca_2N

Part II: Short Answer/Calculations

26. Consider the electron configuration for a magnesium atom.
- What would have to happen for a magnesium atom to have a noble gas electron configuration?
 - What charge would a magnesium ion have?
 - Would a magnesium ion be a cation or an anion?

27. Consider the element sulfur.
- Write the complete electron configuration.
 - Write the noble gas electron configuration.
 - How many valence electrons does this element have? Explain.
28. Lithium reacts with oxygen. What chemical formula would you expect for the resulting compound? Explain your reasoning.
29. Calculate the mass of 83 mL of aluminum. The density of aluminum is 2.7 g/mL.
30. Answer the following questions for an atom with atomic number 15.
- What is the symbol of the element? _____
 - What is the name of the element? _____
 - How many protons does this atom have? _____
 - How many neutrons would this atom most likely have? _____
 - How many electrons does this atom have? _____
 - How many core electrons does this atom have? _____
 - How many valence electrons does this atom have? _____
 - Name two other elements with similar chemical properties. _____
 - Is this atom a metal or a nonmetal? _____

***Note: There will be a lab portion of the exam. ***

Answers:

1. B 2. C 3. C 4. D 5. C 6. A 7. A 8. D 9. A 10. B 11. D 12. C 13. C
 14. C 15. B 16. D 17. A 18. D 19. C 20. B 21. C 22. A 23. A 24. C 25. B
 26. a) Lose 2 electrons b). 2+ c). Cation 27. a. $1s^2 2s^2 2p^6 3s^2 3p^4$ b. $[\text{Ne}] 3s^2 3p^4$ c. 6
 valence electrons, two in the s subshell and 4 in the p subshell 28. Li_2O ; a compound
 needs a multiple of eight valence electrons. Li has 1 and I has 6, so $2(1) + 6 = 8$ 29. $D = m/v$ $m=(2.7 \text{ g/mL})(83 \text{ mL})$, $m=224 \text{ g}$ 30. a) P b) Phosphorous c) 15 d) 16
 e) 15 f) 10 g) 5 h) N, As, Sb sometimes Bi i) non-metal