Unit: Chemistry Exam Review

True/False

Indicate whether each statement is true or false.
Correct each *false* statement by the changing the **bold** part.

T / F 1. Elements are capable of forming **compounds**, but compounds can't change into **elements**.
T / F 2. Metals usually react to form **cations**.
T / F 3. Molecular compounds tend to have **higher** melting and boiling points than ionic compounds.
T / F 4. An equation is balanced when the sums **of the coefficients** on both sides of the arrow are the same.
T / F 5. Litmus paper turns **blue** when dipped into an acid.
T / F 6. Acid precipitation results mainly from **combustion** reactions.

Completion

7. A **phosphorus** atom has _____ *valence* electrons.
8. **Carbon dioxide gas** can be produced adding _____ and calcium carbonate .
9. An example of an anion with the same number of electrons as **Ne** is _____ .
10. When a **base** is dissolved in water, _____ ions are produced.
11. Acid + Base _____ + _____ .
12. **Acid precipitation** usually has a *pH* that is less than _____ .

Matching

13. Beside each description (left side), write the term from column **C** that best fits the description. A term may be used once, more than once, or not at all.

Best TERM	DESCRIPTION: C
	• arrangement of elements with similar chemical properties in the periodic table
	• acid
	• reaction that has only one reactant
base	
	• type of ion that is usually formed by nonmetal atoms
anion	
	• group of atoms with a net charge; the atoms are joined by covalent bonds
covalent	
	• type of bond formed when a pair of electrons is shared
decomposition	
	• substance that dissolves in water and forms hydrogen ions
group	
	• substance formed when an acid and a base react
indicator	
	• chemical that changes colour as the concentration of H+(aq) or OH-(aq) changes
	• polyatomic ion
period	
salt	

Multiple Choice

Circle the letter of the best answer for each of the following questions.

14. Which pair of **ions** has the same number of electrons?

(a) Ca+2 and Cl- (b) Ca+2 + and Mg+2 (c) Na+ and Cl-
(d) Mg+2 and C1- (e) Li+ and O-2

15. Which of the following is <u>not</u> a typical property of an **ionic** compound?

(a) Crystals form with a well-defined shape.
(b) Aqueous solutions of ionic compounds are good electrical conductors.
(c) Ionic solids conduct electricity.
(d) Ionic solids have relatively high melting points.
(e) Ionic solids are hard and brittle.

16. When the following equation is correctly balanced, what is the value of x?

Al + x H2SO4 → Al 2(SO4)3 + H2

(a) 1 (b) 2 (c) 3 (d) 4 (e) 5

17. Which of the following equations is/are <u>balanced</u>?

(1) 2KC1 + Pb(N03)2 → PbC12 + KNO3

(2) (NH4)2CO3 → NH3 + 4H2O + CO2

(3) Fe2O3 + CO → 2Fe + CO2

(a) none (b) (2) only (c) (3) only
(d) (1) and (2) only (e) (1), (2), and (3)

18. What is the <u>total</u> number of **atoms** in the formula A12(SO4)3?

(a) 3 (b) 7 (c) 8 (d) 15 (e) 17

19. Which name and formula do <u>not</u> match?

(a) sodium sulfide, Na2S (b) magnesium fluoride, MgF2
(c) potassium carbonate, KCO3 (d) aluminum iodide, AlI3 (e) iron(II) oxide, FeO

Short Answer

20. Draw **Bohr diagrams** for each of the following.

(a) sulfur (b) silicon (c) calcium ion (d) argon

21. Predict the **formula** of the compound resulting from each pair of elements.

(a) Ca and N (b) K and 0 (c) N and O (d) Al and P

22. **Name** the following compounds.

(a) PCl3 (b) Pb(NO3)4 (c) Cal2 (d) Fe2(SO4)3

23. Write **formulas** for the following compounds.

(a) cuprous nitrate (b) mercury(II) bromide (c) nickel(III) hydroxide (d) calcium hydrogen carbonate (e) silver nitrate (f) tin (II) phosphide (g) calcium carbonate

24. Balance the following reaction: FeS + O2 + H2O → Fe2O3 + H2SO4

25. Hydrogen sulfide is a foul-smelling gas. When the gas is bubbled through water, the solution is found to be a poor electrical conductor. Is H2S(aq) an acid or a base? Is it strong or weak?

26. Write the balanced chemi-cal equation, and indicate the *type of reaction*.

(a) Zn(s) + FeC12(aq) → ZnC12(aq) + Fe(s)

(b) Sodium reacts with water to produce sodium hydroxide and hydrogen gas.

(c) Aqueous calcium sulfate reacts with aqueous nickel (II) chloride to form solid nickel (II) sulfate and aqueous . . .

(d) Sodium carbonate reacts with sulfuric acid to form an aqueous solution of sodium sulfate, water, and carbon dioxide gas.

(e) C3H4(g) + H2(g) → C3H8(g)

27. Using Lewis diagrams show how ionic bonding occurs between:

(a) magnesium and oxygen (b) aluminium and fluorine (c) potassium and sulphur

28. Use Lewis diagrams to show the valence electrons in:

(a) Ca (b) Al (c) N (d) O (e) Cl

29. Using Lewis diagrams show how covalent bonding occurs between:

(a) H + O (b) C + H (c) N + Cl (d) S + H

30. Write a balanced chemical equation to show the reaction of barium hydroxide, Ba(OH)2 (aq) with hydrochloric acid, HCl(aq). Name the type of reaction occurring.

31. Describe and explain four ways in which the rate of the reaction could be increased when marble chips, CaCO3(s) are added to dilute hydrochloric acid, HCl(aq).