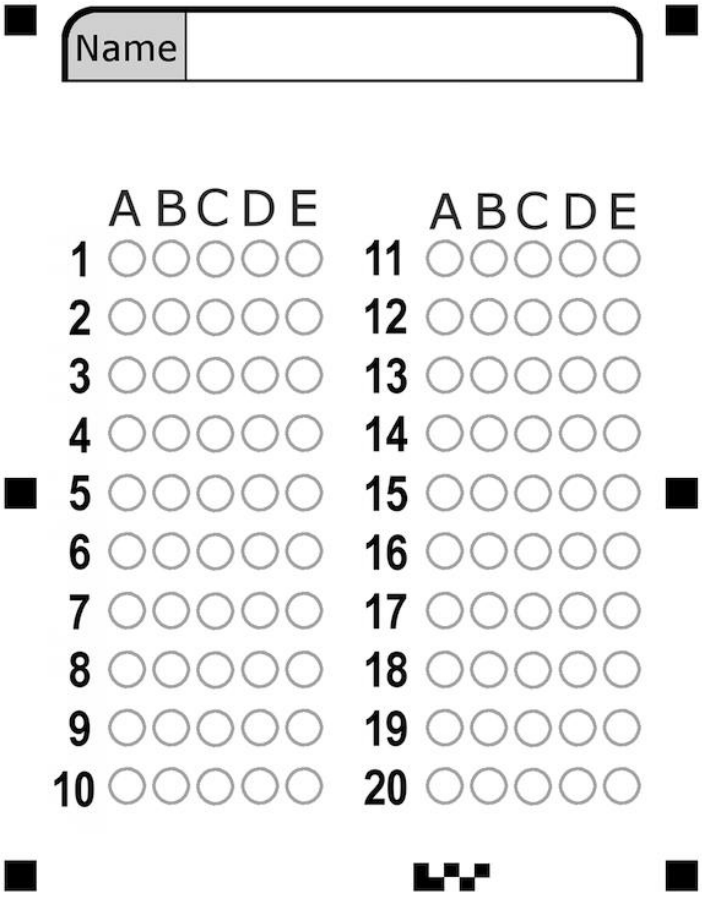
Exam #2



1	1 **H** 1.008	**IIA**											**IIIA**	**IVA**	**VA**	**VIA**	**VIIA**	2 **He** 4.003
2	3 **Li** 6.941	4 **Be** 9.012											5 **B** 10.91	6 **C** 12.01	7 **N** 14.01	8 **O** 16.00	9 **F** 19.00	10 **Ne** 20.18
3	11 **Na** 23.00	12 **Mg** 24.31											13 **Al** 26.98	14 **Si** 28.09	15 **P** 30.97	16 **S** 32.06	17 **Cl** 35.45	18 **Ar** 39.95
4	19 **K** 39.10	20 **Ca** 40.08	21 **Sc** 44.96	22 **Ti** 47.90	23 **V** 50.94	24 **Cr** 52.00	25 **Mn** 54.94	26 **Fe** 55.85	27 **Co** 58.93	28 **Ni** 58.71	29 **Cu** 63.55	30 **Zn** 65.37	31 **Ga** 69.72	32 **Ge** 72.59	33 **As** 74.92	34 **Se** 78.96	35 **Br** 79.90	36 **Kr** 83.80
5	37 **Rb** 85.47	38 **Sr** 87.62	39 **Y** 88.91	40 **Zr** 91.22	41 **Nb** 92.91	42 **Mo** 95.94	43 **Tc** (99)	44 **Ru** 101.0	45 **Rh** 102.9	46 **Pd** 106.4	47 **Ag** 107.9	48 **Cd** 112.4	49 **In** 114.8	50 **Sn** 118.7	51 **Sb** 121.8	52 **Te** 127.6	53 **I** 126.9	54 **Xe** 131.3
6	55 **Cs** 132.9	56 **Ba** 137.3	57 **La*** 138.9	72 **Hf** 178.9	73 **Ta** 180.9	74 W 183.9	75 **Re** 186.2	**76** Os 190.2	77 **Ir** 192.2	78 **Pt** 195.1	79 **Au** 197.0	80 **Hg** 200.6	81 **Tl** 204.4	82 **Pb** 207.2	83 **Bi** 209.0	84 **Po** (210)	85 **At** (210)	86 **Rn** (222)
7	87 **Fr** (223)	88 **Ra** (226)	89 **Ac*** (227)															

Compound of	Rule
Li^+, Na^+, K^+, or $NH_4{}^+$	Always soluble
$NO_3{}^-$ or $C_2H_3O_2{}^-$	Always soluble
Cl^-, Br^-, or I^-	Insoluble with Ag^+, $Hg_2{}^{2+}$, or Pb^{2+}. Soluble with any other ion.
$SO_4{}^{2-}$	Soluble with all the ions except Sr^{2+}, Ba^{2+}, Ag^+, $Hg_2{}^{2+}$, or Pb^{2+}
$CO_3{}^{2-}$ or $PO_4{}^{3-}$	Soluble with Li^+, Na^+, K^+, or $NH_4{}^+$. Insoluble with any other ion.
OH^- or S^{2-}	Soluble with Ca^{2+}, Sr^{2+}, Ba^{2+}, Li^+, Na^+, K^+, or $NH_4{}^+$. Insoluble with any other ion.

1. **What is the correct definition of a subatomic particle?**

   a) A particle that has no charge and is always located outside the nucleus
   b) A particle that is larger than an atom and carries an electric charge
   c) A particle that makes up the entirety of the atom and is always neutrally charged
   d) A particle that is smaller than an atom and makes up the fundamental components of matter, including protons, neutrons, and electrons

2. **Why is the mass number the sum of protons and neutrons?**

   a) Protons and neutrons are the heaviest particles in the atom, and electrons have negligible mass.
   b) Protons and neutrons are both positively charged, and their mass is combined to give the mass number..
   c) Electrons and neutrons have the same mass, so the mass number excludes protons.
   d) Protons and electrons make up most of the mass of an atom, which is why they determine the mass number.

3. **What is the common charge of Cesium (Cs)?**

   a) +1
   b) +2
   c) +3
   d) -2

4. **Which of the following is not a diatomic molecule?**

   a) Oxygen
   b) Carbon
   c) Nitrogen
   d) Hydrogen

5. **What is the correct name for Al_2O_3?**

   a) Aluminum dioxide
   b) Aluminum (III) oxide
   c) Dialuminum trioxide
   d) Aluminum Oxide

6. **Which of the following polyatomic ions has a -3 charge?**

   a) Sulfate
   b) Phosphate
   c) Nitrate
   d) Carbonate

7. **Which of the following is incorrect about the Stock system?**

   a) The Roman numeral is placed in parentheses after the name of the metal
   b) The Stock system is used for naming both ionic and molecular compounds
   c) The Stock system uses Roman numerals to indicate the oxidation state of a metal in a compound
   d) Metals with only one possible oxidation state do not require a Roman numeral in the Stock system

8. **Which of the following is the correct name for $HNO_3(aq)$?**

   a) Nitrous acid
   b) Nitric acid
   c) Hydrogen nitrate
   d) Hydroxynitric acid

9. **Ionic compounds must be represented by their empirical formula. True or false?**

   a) True
   b) False
   c) Need more information

10. **What is the correct conversion factor between grams and molecules?**

    a) Volume and Avogadro's number
    b) Density and molar mass
    c) Molar mass and Avogadro's number
    d) Atomic number and Avogadro's number

11. What is the name of the number used to balance chemical equations?

a) Molar mass
b) Superscript
c) Subscript
d) Coefficient

12. Which of the following statements is false about a double-displacement reaction?

a) Two compounds exchange ions to form two new compounds
b) A precipitate, gas, or water is often formed as a result of the reaction.
c) Double-displacement reactions only occur in aqueous solutions
d) One of the products must be non-aqueous in the solution for the reaction to proceed.

13. What is the main difference between an ionic equation and a net ionic equation?

a) An ionic equation shows only the neutral compounds
b) A net ionic equation shows only the species that undergo change, while an ionic equation includes all ions present in the reaction
c) The net ionic equation includes spectator ions, while the ionic equation does not
d) An ionic equation only shows the products of the reaction

14. In SO_3^{2-}, which element has an oxidation number of -2?

a) Oxygen
b) Sulfur
c) Both
d) Need more information

15. Which of the following reactions involves the reduction of Zn?

a) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
b) $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
c) $ZnO + CO \rightarrow Zn + CO_2$
d) $Zn + O_2 \rightarrow ZnO$

16. Reducing agent and reduced element can be the same. True or false?

a) True
b) False
c) Need more info

17. What is the correct definition of an isotope?

a) Atoms of the same element that have the same number of protons but different numbers of neutrons
b) Atoms with different numbers of protons but the same mass number.
c) Atoms of different elements that have the same number of protons.
d) Atoms with the same number of neutrons but different numbers of protons.

18. Which of the following statements is not correct about dissociation?

a) Molecular compounds dissociate into ions when dissolved in water.
b) Dissociation refers to the process where ionic compounds separate into their individual ions in solution.
c) Ionic dissociation typically occurs when an ionic compound is dissolved in a polar solvent, like water.
d) Dissociation happens with aqueous compounds.

19. What is the correct prefix used for 10 atoms?

a) Deca-
b) Dodeca-
c) Nona-
d) Hexa-

20. Which of the following isotope has 50 neutrons?

a) Nickel-60 (Ni-60)
b) Cobalt-59 (Co-59)
c) Strontium-88 (Sr-88)
d) Rubidium-85 (Rb-85)

Name:_____

21. A mystery element Q occurs as three isotopes. Analysis of a sample of Q showed:

Isotope	Mass (amu)	Abundance (%)
A	2.45	32.00
B	3.33	14.00
C	6.76	54.00

Calculate the average atomic mass of Q.

22. A solution is composed of 343 mg of NaCl (salt) dissolved in 10.43 g of water. What is the percent composition of NaCl in this solution?

23. What is the correct formula for a cyanide ion?

_____

24. How many g is equivalent to 2.23×10^{12} molecules of $Al_2(SO_4)_3$?

25. A compound is composed of 39.341% carbon (C), 8.254% hydrogen (H), and 52.406% oxygen (O)

a) Determine the empirical formula

b) Determine the molecular formula of the compound if the experimental molar mass of the compound is 180.16 g/mol

26. Consider a reaction between NaCl and $AgNO_3$.

a) Write the balanced molecular equation for this reaction, including the physical states of all reactants and products.

b) White ionic equation

c) Write net ionic equation