

IA																	VIII A								
1 H 1.01											2 He 4.00														
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 15.999	9 F 18.998	10 Ne 20.18								
11 Na 22.99	12 Mg 24.31	13 Al 26.98	14 Si 28.086	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 51.996	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.70	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
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 (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.4	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.30								
55 Cs 132.91	56 Ba 137.33	57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97									
87 Fr (223)	88 Ra 226.03	89 Ac 227.03	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)									
104 Unq (261)	105 Unp (262)	106 Unh (263)																							

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

Instructions:

- This exam consists of **20** questions.
- No scratch paper is allowed.** You may do the work in the test margins and on the backs of the test pages.
- Mark the answers you choose on the test itself for your own information and also on the standard answer sheet you provided. **Scoring will be based on the answer sheet.**
- When you finish, turn in both the test form and the answer form. The test form and your personal report will be returned to you at the next class. Write your **name on both forms.**
Write the test version (A, B, C, etc.) on the top of the answer form.

Useful Information:

$$N_A = 6.022 \times 10^{23}$$

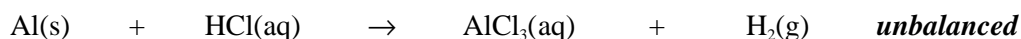
- What is the mass percent of sulfur in aluminum sulfite?
 - 10.9%
 - 36.0%
 - 30.0%
 - 32.7%
 - 48.5%
- What is the molar mass of ammonium nitrate?
 - 80.1 g/mol
 - 64.1 g/mol
 - 142 g/mol
 - 94.1 g/mol
 110. g/mol

3. Copper has two naturally occurring isotopes, copper-63 with a mass of 62.9298 amu and copper-65 with a mass of 64.9278 amu. Its average atomic mass is 63.55 amu. What is the percent abundance of the copper-63 isotope?
- 23.5%
 - 38.1%
 - 50.2%
 - 59.6%
 - 69.0%

4. Write the balanced equation for the complete combustion of cyclobutanol, C_4H_7OH . What is the coefficient on oxygen when this reaction is balanced using the smallest whole-number coefficients?

- 4
- 6
- 7
- 11
- 12

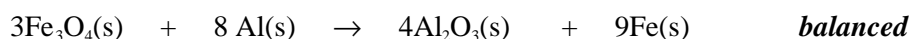
5. Consider the following unbalanced equation:



How many grams of HCl are needed to react completely with 15.0 g of Al?

- 60.8 g
 - 40.5 g
 - 45.0 g
 - 20.3 g
 - 6.76 g
6. If 12.0 g of hydrogen gas reacts with 15.0 g of oxygen gas to form water, what is the maximum amount of water that can be formed?
- 8.45 g
 - 16.9 g
 - 18.6 g
 - 27.0 g
 - 107 g
7. The density of chloroform, $CHCl_3$, is 1.492 g/cm^3 . How many chlorine atoms are present in 2.5 μL of $CHCl_3$?
- 5.6×10^{19}
 - 3.8×10^{22}
 - 1.3×10^{22}
 - 1.9×10^{25}
 - 1.9×10^{19}

8. Consider the balanced equation below:



If 15.00 g of Fe_3O_4 reacts with excess aluminum to form 3.50 g of Al_2O_3 , what is the percent yield? (The molar mass of Fe_3O_4 is 231.6 g/mol; the molar mass of Al_2O_3 is 102.0 g/mol.)

- a) 7.71%
- b) 39.7%
- c) 23.3%
- d) 70.6%
- e) 53.0%

9. A certain unknown compound contains only carbon and hydrogen. Combustion of 1.000 g of this compound produces 3.138 g of CO_2 and 1.285 g of H_2O . The molar mass of this compound is between 75 and 90 g/mol. What is the molecular formula of the unknown?

- a) C_3H_{15}
- b) C_7H_8
- c) C_6H_{12}
- d) C_6H_6
- e) C_6H_3

10. Perform the calculation below. How should the result of this calculation be expressed, taking into account the appropriate use of significant figures?

$$\frac{17.925 - 5.32}{4.9273}$$

- a) 2.6
- b) 2.56
- c) 2.558
- d) 2.5582
- e) 2.55820

11. Perform the calculation below. How should the result of this calculation be expressed, taking into account the appropriate use of significant figures?

$$8.67 \times 10^{-5} + 9.7325 \times 10^{-4} + 2.742 \times 10^{-6}$$

- a) 1.06×10^{-3}
- b) 1.063×10^{-3}
- c) 1.0627×10^{-3}
- d) 1.06269×10^{-3}
- e) 1.062692×10^{-3}

12. The formula of bromic acid is

- a) HBr
- b) HBrO_4
- c) HBrO_3
- d) HBrO_2
- e) HBrO

13. Which of the following formula/name combinations is incorrect?

- a) BaPO_4 barium phosphate
- b) MnO_2 manganese(IV) oxide
- c) Hg_2Cl_2 mercury(I) chloride

- d) K_2CO_3 potassium carbonate
e) CuCl copper(I) chloride

14. Which element below is an alkaline earth metal?

- a) Ti
b) Sr
c) Ne
d) Cl
e) Na

15. How many protons, neutrons, and electrons are present in $^{56}\text{Fe}^{2+}$?

- | | <u>protons</u> | <u>neutrons</u> | <u>electrons</u> |
|----|----------------|-----------------|------------------|
| a) | 26 | 30 | 28 |
| b) | 26 | 56 | 28 |
| c) | 26 | 56 | 24 |
| d) | 26 | 30 | 24 |
| e) | 56 | 26 | 28 |

16. Convert 4.25 mL to μL .

- a) $4.25 \times 10^{-4} \mu\text{L}$
b) $4.25 \times 10^{-3} \mu\text{L}$
c) $4.25 \times 10^2 \mu\text{L}$
d) $4.25 \times 10^3 \mu\text{L}$
e) $4.25 \times 10^4 \mu\text{L}$

17. Pure gold has a density of 18.9 g/cm^3 . Express this density in units of lb/ft^3 .

- a) $1.18 \times 10^6 \text{ lb/ft}^3$
b) $1.27 \times 10^3 \text{ lb/ft}^3$
c) 1.27 lb/ft^3
d) 819 lb/ft^3
e) $1.18 \times 10^3 \text{ lb/ft}^3$

18. A certain liquid has a density of 2.67 g/mL . What volume (in L) would 1340 g of this liquid occupy?

- a) $2.00 \times 10^{-3} \text{ L}$
b) 50.2 L
c) 3.58 L
d) 35.8 L
e) 0.502 L

19. The average atomic mass of carbon is 12.011. Assuming that you were able to pick up only one carbon atom, the chance that you would randomly choose one with a mass of 12.011 amu is

- a) 1.1%
b) 12%
c) 12.011%
d) greater than 50%
e) 0%

20. Convert 70.0 mi/hr to m/s . (1 mi = 1.6093 km)

- a) 29.2 m/s

- b) 31.3 m/s
- c) 37.6 m/s
- d) 157 m/s
- e) 406 m/s

Answer Key

- | | | | |
|------|-------|-------|-------|
| 1. d | 6. b | 11. c | 16. d |
| 2. a | 7. a | 12. c | 17. e |
| 3. e | 8. b | 13. a | 18. e |
| 4. d | 9. c | 14. b | 19. e |
| 5. a | 10. c | 15. d | 20. b |