 Exam 1 Name: _____

Chem 111 *2:30p section* *Evening Exam #1*

This exam is composed of 20 questions, 6 of which require mathematics that might require a calculator. Go initially through the exam and answer the questions you can answer *quickly*. Then go back and try the ones that are more challenging to you and/or that require calculations.

As discussed in the course syllabus, honesty and integrity are absolute essentials for this class. In fairness to others, dishonest behavior will be dealt with to the full extent of University regulations.

I hereby state that all answers on this exam are my own and that I have neither gained unfairly from others nor have I assisted others in obtaining an unfair advantage on this exam.

_____
Signature

$E = h\nu = \frac{hc}{\lambda}$ $E_n^{H-atom} = -\frac{R_H hc}{n^2}$ 1 mL = 1 cm^3	**Some common ions:** PO_4^{3-} CN^- $CH_3CO_2^-$ NO_2^- NO_3^- CO_3^{2-} SO_3^{2-} SO_4^{2-}	$h = 6.626x10^{-34}\ J\ s$ $c = 2.9998x10^8\ m\ s^{-1}$ $N = 6.022x10^{23}\ mol^{-1}$ $R_H = 1.097x10^7\ m^{-1}$

PERIODIC TABLE OF THE ELEMENTS

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1 H 1.008																	2 He 4.003
3 Li 6.939	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	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 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	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 (99)	44 Ru 101.1	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
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 181.0	74 W 183.8	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 (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra 226.0	89 Ac 227.0	104 Unq (261)	105 Unp (262)	106 Unh (263)	107 Uns (262)	108 Uno (265)	109 Une (266)									

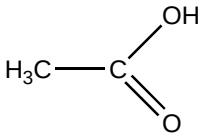
1. What is the charge of the most common ion formed from **Ba**?

   1) +1 2) +2 3) -1 4) -2 5) -3

2. What is the charge of the most common ion formed from **Br**?

   1) +1 2) +2 3) -1 4) -2 5) -3

3. The correct molecular formula for the molecule at right is:



   1) CO_2H_4 2) $C_2O_2H_4$ 3) $C_2O_2H_3$ 4) C_2OH_4

4. The equation at right yields a result in

$$\frac{\left(kg\ m^2\ s^{-2}\right)\left(m\ s^{-1}\right)^{-1}}{\left(kg\right)}$$

   1) length 2) mass 3) volume
   4) velocity 5) time

5. A specific isotope of an ion from a given element has 8 protons, 7 neutrons, and 10 electrons. The ion is:

   1) Mn^{3+} 2) N^{3-} 3) P^{3-} 4) Ne^{3-} 5) O^{2-}

6. What is the formula of the ionic compound formed in the reaction of elemental **K** and $\mathbf{F_2}$?

   1) KF_2 2) KF 3) K_2F_3 4) K_3F_2 5) K_2F

7. What is the formula of the ionic compound formed between the ions $\mathbf{Fe^{3+}}$ and $\mathbf{S^{2-}}$?

   1) Fe_2S_3 2) Fe_3S_2 3) FeS_3 4) Fe_2S 5) none of these

8. Which of the following is ***not*** an ionic compound?

   1) CaO 2) CO_2 3) KF 4) NaCN 5) $FeCl_2$

9. What is the molar mass of **carbon monoxide**?

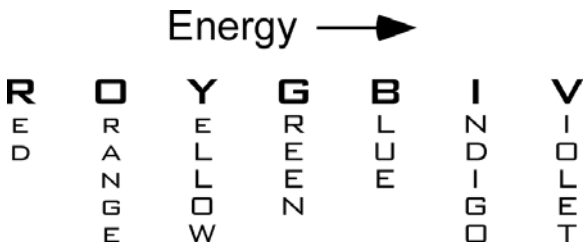
   1) 60 g/mol 2) 28 g/mol 3) 64 g/mol 4) 32 g/mol 5) 44 g/mol

10. A sample of cyclopropane, $\mathbf{C_3H_6}$, contains 0.104 mol of the compound. What is the mass of this sample, in grams?

1) 5.84 g 2) 56.1g 3) 42.1 g 4) 4.38 g 5) 18.7 g

11. What is the (mass) percent composition of **C** in $\mathbf{C_3H_6}$?

1) 88.3% 2) 14.4% 3) 50.0% 4) 11.7% 5) 85.6%



12. Which color of light has the highest frequency?

1) red 2) yellow 3) green 4) blue 5) violet

13. What is the wavelength of ultraviolet light with frequency 8.57×10^{14} Hz?

1) 209 nm 2) 254 nm 3) 280 nm 4) 190 nm 5) 350 nm

14. What is the wavelength of the photon emitted by a hydrogen atom when the electron goes from n=3 to n=2?

The Rydberg constant R for the hydrogen atom is 1.097×10^{7} m^{-1}.

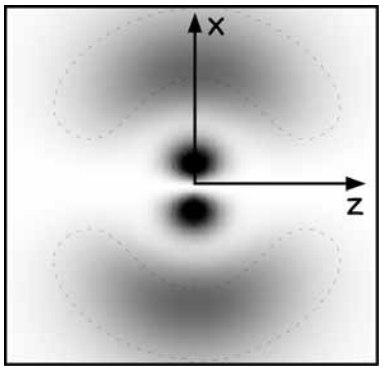
1) 210 nm 2) 656 nm 3) 434 nm 4) 902 nm 5) 122 nm

15. A local radio station, WMUA, can be found at 91.1 MHz on the FM dial. The wavelength of this station's electromagnetic radiation is:

1) 2.97 m 2) 3.29 m 3) 3.39 m 4) 3.17 m 5) 8.85 m

16. The orbital depicted at right is:

1) $2p_z$ 2) $3p_x$ 3) $3p_z$ 4) $4p_x$ 5) $4p_z$



17. Which of the following quantum number sets is ***not*** allowed?

1) n=+3 l=+2 m_l = -1 m_s = +1/2 2) n=+2 l=+1 m_l = -2 m_s = +1/2

3) n=+3 l=+1 m_l = -1 m_s = -1/2 4) n=+2 l=0 m_l = 0 m_s = +1/2

5) n=+3 l=0 m_l = 0 m_s = -1/2

18. What is the maximum number of orbitals that can be identified by the set of quantum numbers n=+6 l=+2 ?

1) 7 2) 6 3) 5 4) 3 5) 2

19. The magnetic quantum number m_l specifies:

1) subshell orbital shape 2) orbital orientation
3) transition probability 4) orbital karma
5) energy and distance from nucleus

20. What is the catalog number for this class?

1) 222 2) 123 3) 111 4) 3.14159 5) 68.6 g