Chem 111 Exam #3 Bonus Points

Name: ______ Answer Key – Exam Version B

** Enter your answers on the reverse. **

This exam is composed of **5 questions** on the reverse.

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.

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

$E = h\nu = \frac{hc}{\lambda}$	**Some common ions:**	$h = 6.626 x 10^{-34}\ J\ s$
$E_n^{H-atom} = -\frac{R_H hc}{n^2}$	PO_4^{3-} CN^- $CH_3CO_2^-$	$c = 2.9998 x 10^{8}\ m\ s^{-1}$
1 mL = 1 cm^3	NO_2^- NO_3^- CO_3^{2-}	$N = 6.022 x 10^{23}\ mol^{-1}$
	SO_3^{2-} SO_4^{2-}	$R_H = 1.097 x 10^{7}\ m^{-1}$

c

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)	e								

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Very clearly *write the answer in the box choice that best completes the statement or answers the question.*

1. Which of the following characteristics apply to SiO_2? (this is **not** the molecule from Monday!)

   1. polar bonds
   2. nonpolar molecule
   3. linear molecular shape
   4. *sp* hybridized

   a. 1 only
   b. 1 and 2
   c. 3 and 4
   d. 1, 2, 3, and 4
   e. 1, 2, and 3

   ANS: D TOP: 9.2 Valence Bond Theory

2. Which one of the following compounds is a **nonelectrolyte** when dissolved in water?

   a. HCl
   b. $MgBr_2$
   c. KI
   d. $Zn(NO_3)_2$
   e. O_2

   ANS: E TOP: 3.5 Ions and Molecules in Aqueous Solutions

3. Write a balanced **net ionic equation** for the reaction of aqueous solutions of baking soda ($NaHCO_3$) and acetic acid (CH_3CO_2H).

   a. $NaHCO_3(aq) + H^+(aq) \rightarrow H_2CO_3(s) + Na^+(aq)$
   b. $2\ NaHCO_3(aq) + CH_3CO_2H(aq) \rightarrow 2\ Na_2CO_3(aq) + CH_4(aq) + 2H_2O(™) + CO_2(g)$
   c. $HCO_3^-(aq) + CH_3CO_2H(aq) \rightarrow CH_3CO_2^-(aq) + H_2O(™) + CO_2(g)$
   d. $HCO_3^-(aq) + H^+(aq) \rightarrow H_2O(™) + CO_2(g)$
   e. $HCO_3^-(aq) + H^+(aq) \rightarrow H_2CO_3(aq)$

   ANS: C or D TOP: 3.8 Gas-Forming Reactions

   OK – you got me. The book is correct that C is the right answer, but I said D in class today, so I'll take either as correct. Here's the story. I fully separated the acetic acid, treating it as a strong acid (which it is not). An analogy here: if one side has an insoluble species, we write it as the insoluble (s) species in the equation. You're probably all comfortable with that. Weak acids should be treated similarly, and so should show up on one side as the undissociated acid form (in this case CH_3CO_2H). Sorry for the confusion. My mistake – you win.
   For this question on some versions of Evening Exam 3, I will keep grading as is. In other words, the weak acid should be presented in its undissociated form.

4. What is the **molecular** geometry around a central atom that is sp^3d hybridized and has one lone pair of eletrons?

   a. trigonal bipyramidal
   b. trigonal-pyramidal
   c. see-saw
   d. tetrahedral
   e. square-planar

   ANS: C TOP: 9.2 Valence Bond Theory

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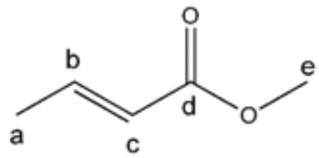
☐ 5. Which carbon center below is most deficient in electrons?



ANS: D