## Chem 302 / Spring 2012 / Quiz 1 (20 points) / Feb 10, 2012

1. (4 pts) Report the total number of  $\pi$  electrons in the molecule below, and classify the molecule as aromatic, antiaromatic, or nonaromatic. You can assume the molecule is planar. No explanation necessary.

**2.** (5 pts) Draw the structure of the product formed when the molecule below is reacted with one equivalent of HCl, and BRIEFLY explain your reasoning.

**3.** (7 pts) Predict the major product of the reaction below. Using curved arrow notation, draw a mechanism to illustrate formation of this major product. Note: You may use AlCl<sub>3</sub> and/or AlCl<sub>4</sub> in the mechanism as needed. If an intermediate is resonance stabilized, it is necessary to show only ONE structure; you do not need to show all possible resonance structures.

**4.** (4 pts) Draw ONE key resonance structure of a carbocation intermediate to illustrate why an OH substituent is more activating than a CH<sub>3</sub> substituent in an electrophilic aromatic substitution.

	1A H Hydrogen 1.01 3 Li	2 2A 4 Be Beryllium											13 3A 5 <b>B</b>	14 4A 6 C	15 5A 7 <b>N</b> Nitrogen	16 6A 8 O Oxygen	17 7A 9 <b>F</b> Fluorine	2 He Helium 4.00 10 Ne Neon
	6.94 11 <b>Na</b> Sodium 22.99	9.01 12 <b>Mg</b> Magnesium 24.31	3 3B	4 4B	5 5B	6 6B	7 7B	8	9 — 8B	10	11 1 1B	12 2B	10.81 13 <b>Al</b> Aluminum 26.98	12.01 14 Si Silicon 28.09	14.01 15 <b>P</b> Phosphorus 30.97	16.00 16 <b>S</b> Sulfur 32.07	19.00 17 CI Chlorine 35.45	20.18 18 Ar Argon 39.95
-	19 <b>K</b> Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 <b>Ti</b> Tilanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 <b>Mn</b> Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 <b>Zn</b> Zinc 65.39	Ga Gallium 69.72	32 <b>Ge</b> Germanium 72.61	As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80
(4)	37 <b>Rb</b> Rubidium 85,47	38 Sr Strontium 87,62	39 <b>Y</b> Yttrium 88,91	40 <b>Zr</b> Zirconium 91,22	41 <b>Nb</b> Niobium 92.91	42 Mo Molybdenum 95.94	43 <b>Tc</b> Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 <b>Ag</b> Silver 107.87	48 Cd Cadmium 112,41	49 <b>In</b> Indium 114,82	50 <b>Sn</b> Tin 118,71	51 Sb Antimony 121,76	52 <b>Te</b> Tellurium 127,60	53       lodine   126,90	54 <b>Xe</b> Xenon 131,29
	55 Cs Cesium 132.91	56 <b>Ba</b> Barium 137,33	57 <b>La</b> Lanthanum 138.91	72 <b>Hf</b> Hafnium 178.49	73 <b>Ta</b> Tantalum 180,95	74 <b>W</b> Tungsten 183.84	75 Re Rhenium 186,21	76 <b>Os</b> Osmium 190,23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 <b>Au</b> Gold 196,97	80 Hg Mercury 200.59	81 TI Thallium 204,38	82 <b>Pb</b> Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)
	87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 <b>Rf</b> Rutherlordium (261)	105 <b>Db</b> Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)									
If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.				nen	58 Ce Cerium 140.12	59 <b>Pr</b> Praseodymium 140.91	60 <b>Nd</b> Neodymium 144.24 92	61 Pm Promethium (145) 93	62 <b>Sm</b> Samarium 150.36	63 <b>Eu</b> Europium 151.96	64 <b>Gd</b> Gadolinium 157.25 96	65 <b>Tb</b> Terbium 158.93	66 <b>Dy</b> Dysprosium 162.50	67 <b>Ho</b> Holmium 164.93	68 <b>Er</b> Erbium 167.26	69 <b>Tm</b> Thulium 168.93	70 <b>Yb</b> Ytterbium 173.04 102	71 <b>Lu</b> Lutetium 174,97
					Th Thorium 232.04	Pa Protactinium 231.04	U	Np Neptunium (237)	Pu Plutonium (244)	Am Americium (243)	Cm Curium (247)	Bk Berkelium (247)	Cf Californium (251)	Es Einsteinium (252)	Fm Fermium (257)	Md Mendelevium (258)	No Nobelium (259)	Lr Lawrenciu (262)

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