

Practice General Chemistry Speaking Test 4 (by Leticia Medina, Spring 2005)

hydrogen 1 H 1.0079																	helium 2 He 4.0026						
lithium 3 Li 6.941	beryllium 4 Be 9.0122																	boron 5 B 10.811	carbon 6 C 12.011	nitrogen 7 N 14.007	oxygen 8 O 15.999	fluorine 9 F 18.998	neon 10 Ne 20.180
sodium 11 Na 22.990	magnesium 12 Mg 24.305																	aluminum 13 Al 26.982	silicon 14 Si 28.086	phosphorus 15 P 30.974	sulfur 16 S 32.065	chlorine 17 Cl 35.453	argon 18 Ar 39.948
potassium 19 K 39.098	calcium 20 Ca 40.078	scandium 21 Sc 44.956	titanium 22 Ti 47.867	vanadium 23 V 50.942	chromium 24 Cr 51.996	manganese 25 Mn 54.938	iron 26 Fe 55.845	cobalt 27 Co 58.933	nickel 28 Ni 58.693	copper 29 Cu 63.546	zinc 30 Zn 65.39	gallium 31 Ga 69.723	germanium 32 Ge 72.61	arsenic 33 As 74.922	selenium 34 Se 78.96	bromine 35 Br 79.904	krypton 36 Kr 83.80						
rubidium 37 Rb 85.468	strontium 38 Sr 87.62	yttrium 39 Y 88.906	zirconium 40 Zr 91.224	niobium 41 Nb 92.906	molybdenum 42 Mo 95.94	technetium 43 Tc [98]	ruthenium 44 Ru 101.07	rhodium 45 Rh 102.91	palladium 46 Pd 106.42	silver 47 Ag 107.87	cadmium 48 Cd 112.41	indium 49 In 114.82	tin 50 Sn 118.71	antimony 51 Sb 121.76	tellurium 52 Te 127.60	iodine 53 I 126.90	xenon 54 Xe 131.29						
cesium 55 Cs 132.91	barium 56 Ba 137.33	lanthanum 57 La 138.91	hafnium 71 Hf 178.49	tantalum 72 Ta 180.95	tungsten 73 W 183.84	rhenium 74 Re 186.21	osmium 75 Os 190.23	iridium 76 Ir 192.22	platinum 77 Pt 195.08	gold 78 Au 196.97	mercury 79 Hg 200.59	thallium 80 Tl 204.38	lead 81 Pb 207.2	bismuth 82 Bi 208.98	polonium 83 Po [209]	astatine 84 At [210]	radon 85 Rn [222]						
francium 87 Fr [223]	radium 88 Ra [226]	actinium 89 Ac [227]	lawrencium 103 Lr [262]	rutherfordium 104 Rf [261]	dubnium 105 Db [262]	seaborgium 106 Sg [266]	bohrium 107 Bh [264]	hassium 108 Hs [269]	meitnerium 109 Mt [288]	unnilium 110 Uun [271]	ununium 111 Uuu [272]	unbinium 112 Uub [277]	unquadium 114 Uuq [289]										
		*lanthanoids																					
		lanthanum 57 La 138.91	cerium 58 Ce 140.12	praseodymium 59 Pr 140.91	neodymium 60 Nd 144.24	promethium 61 Pm [145]	samarium 62 Sm 150.36	europium 63 Eu 151.96	gadolinium 64 Gd 157.25	terbium 65 Tb 158.93	dysprosium 66 Dy 162.50	holmium 67 Ho 164.93	erbium 68 Er 167.26	thulium 69 Tm 168.93	ytterbium 70 Yb 173.04								
		**actinoids																					
		actinium 89 Ac [227]	thorium 90 Th 232.04	protactinium 91 Pa 231.04	uranium 92 U 238.03	neptunium 93 Np [237]	plutonium 94 Pu [244]	americium 95 Am [243]	curium 96 Cm [247]	berkelium 97 Bk [247]	californium 98 Cf [251]	einsteinium 99 Es [252]	fermium 100 Fm [257]	mendelevium 101 Md [288]	nobelium 102 No [289]								

Answer all questions using the periodic table

1. What are the common names given to the elements in the following groups: 1A, 2A, 6A, 7A and 8A (30 seconds).
2. Name the elements that are usually considered to be the metalloids (30 seconds).
3. Describe some of the physical properties of metals and compare them to non-metals (60 seconds).

Large 2s-2p interaction				Small 2s-2p interaction		
	B ₂	C ₂	N ₂	O ₂	F ₂	Ne ₂
σ_{2p}^*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox" value="↑↓"/>
π_{2p}^*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox" value="↑ ↑"/>	<input type="checkbox" value="↑↓ ↑↓"/>	<input type="checkbox" value="↑↓ ↑↓"/>
σ_{2p}	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓ ↑↓"/>	<input type="checkbox" value="↑↓ ↑↓"/>	<input type="checkbox" value="↑↓ ↑↓"/>
π_{2p}	<input type="checkbox" value="↑ ↑"/>	<input type="checkbox" value="↑↓ ↑↓"/>	<input type="checkbox" value="↑↓ ↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>
σ_{2s}^*	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>
σ_{2s}	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>	<input type="checkbox" value="↑↓"/>

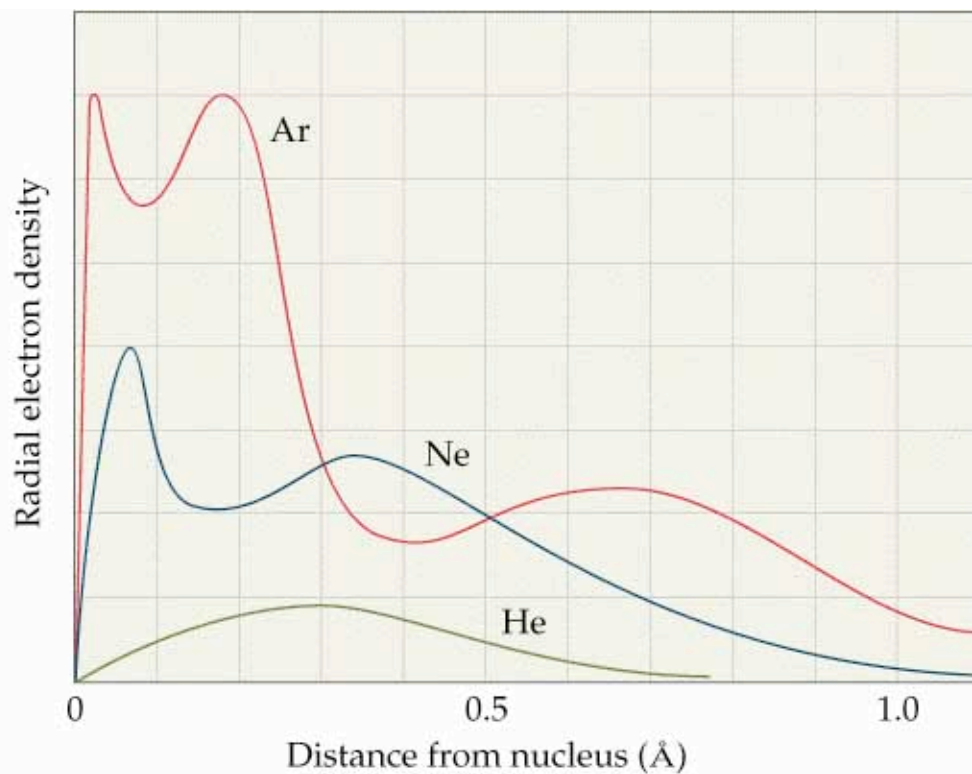
(Figure 9.39 in the Textbook)

- Using as much of the allowed time as possible (but no more!), explain the theory that was used to construct the Table above. (60 seconds).
- Using the Table above, explain why the bond length for F₂ is larger than that for O₂. (30 seconds)
- Using the Table above, explain why the magnetic properties of B₂ and O₂ are different from those of the other diatomics. (45 seconds)
- Using the Table above, explain why Ne₂ is not stable and why N₂ is particularly stable. Your explanation should include the terms "bond order" and "anti-bonding molecular orbital". (60 seconds)

(From Chapter 2 of the Textbook)

8. Give the elements that are commonly found in covalent bonds in organic molecules. In addition to these elements, which *ions* are required by all living organisms? (60 seconds)

9. Explain how the following are named: Cations formed from non-metallic atoms, simple inorganic anions, polyatomic anions containing oxygen. (60 seconds)



(Figure 7.3 in the Textbook)

10. Explain why the plot above has three maxima for argon, two for neon and one for helium. Explain why the first maximum for argon occurs at much smaller distance from the nucleus than that for neon. (60 seconds).

11. Each plot has one maximum that is farthest from the nucleus (helium only has one). Explain why the distance from the nucleus for this maximum increases in the order helium < neon < argon. (45 seconds).

12. Now imagine that you are TA'ing a general chemistry class. Announce the following changes to the CHM 101 syllabus for spring 2005 semester. (90 seconds).

Week	Mon	Wed	Fri	Assignments due
1/17 – 1/21	HOLIDAY NO CLASSES	Course Introduction	Begin Ch.1	Worksheet #1 1/21
1/24 – 1/28	Finish Ch.1 Start Ch.2	Continue Ch.2	Continue Ch.2	Worksheet #2 1/28
1/31 – 2/4	Finish Ch.2	Start Ch.3	Continue Ch.3	Worksheet #3 2/4
2/7 – 2/11	Continue Ch.3 Finish Ch.3 & Review Session	Finish Ch.3 Study Day! NO CLASS	Exam #1 Ch.1 -3	Worksheet #4 2/11 @ end of class 2/7
2/14 – 2/18	Start Ch.4	Finish Ch.4	Start Ch.5	Worksheet #5 2/18
2/21 – 2/25	Continue Ch.5	Continue Ch.5	Finish Ch.5	Worksheet #6 2/25
2/28 – 3/4	Start Ch.6	Finish Ch.6	Start Ch.7	Worksheet #7 3/4
3/7 – 3/11	Continue Ch.7 Finish Ch.7 & Review Session	Finish Ch.7 Study Day! NO CLASS	Exam #2 Ch. 4 - 7	Worksheet #8 3/11 @ end of class 3/7
Spring Break 3/14 – 3/18	NO CLASSES	NO CLASSES	NO CLASSES	HAVE FUN!