

Brooklyn College of C.U.N.Y.

Department of Chemistry

Chemistry 1.2

Quiz 2

Spring 2007

Form B

Directions: Circle the correct choice.

- Which of the following elements is a nonmetal?
a. Si b. Cu c. Pb d. Mg e. C
- Which of the following has the largest radius? a. Na^+ b. Li^+ c. Cl^- d. Cl e. H
- The electron configuration of S^{2-} is...
a. $1s^2 2s^2 2p^6 3s^2 3p^5$ b. $1s^2 2s^2 2p^6 3s^2 3p^6$ c. $1s^2 2s^2 2p^6 3d^{10}$ d. $1s^2 2s^2 2p^6$ e. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$
- Which of the following has the most negative electron affinity? a. F b. Li c. Na d. Br e. Ne
- Which of the following has the lowest ionization energy? a. Li b. K^+ c. K d. Ne e. O
- Which of these atoms has the largest first ionization energy? a. Cs b. Na c. Si d. Ne e. F
- Which of the following elements has the most **nonmetallic** character? a. F b. Ge c. Hg d. In e. S
- What is the electron configuration of Fe^{3+} ? a. $[\text{Ar}]4s^2 3d^9$ b. $[\text{Ar}]4s^1 3d^5$ c. $[\text{Ar}]4s^2 3d^3$ d. $[\text{Ar}]3d^5$ e. $[\text{Ar}]3d^6$
- Which of the following elements is the least electronegative? a. F b. Ga c. Os d. P e. Ra
- Which of the following has the largest size? a. O b. F c. Al^{3+} d. K^+ e. Rb
- Which pair of elements reacts to form an ionic compound? a. calcium and copper b. calcium and chlorine
c. nitrogen and chlorine d. argon and oxygen e. fluorine and iodine
- The smallest atom in the following list is: a. B b. C c. N d. P e. As
- Which of the following elements would be expected to lose electrons and form positive ions when it reacts? a. phosphorus b. nitrogen c. iron d. iodine e. fluorine
- Which of the ions is *unlikely* to be formed? a. O^{2-} b. Al^{3+} c. Na^+ d. S^{3-} e. Mg^{2+}
- Which of the species below has the smallest radius?
a. Na^+ b. O^{2-} c. Ne d. N^{3-} e. Mg^{2+}

IA																										0
1 H 1.008	IIA															IIIA					6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18	
3 Li 6.941	4 Be 9.012															13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95					
11 Na 22.99	12 Mg 24.31	IIIB	IVB	VB	VIB	VII B	VIII B			IB	II B	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							
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 58.70	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								
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 101.1	45 Rh 102.9	46 Pd 106.4	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)								
55 Cs 132.9	56 Ba 137.3	57 * La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	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)	104 Rf	105 Ha	106 Unh	107 Uns	108	109 Uue																		

* 58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
*** 90 Th 232.0	91 Pa (231)	92 U 238.0	93 Np (244)	94 Pu (242)	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)

(over) →

IA																				0		
1 H 1.008										IIA					III A					2 He 4.003		
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11 Na 22.99	12 Mg 24.31	IIIB			IVB		VB		VIB		VIIB		VIIIB		IIB		13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
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17. The successive ionization energies of a certain element in units of kJ/mol are: $I_1 = 578$; $I_2 = 1820$; $I_3 = 2750$; $I_4 = 11,600$. [I_1 is the first ionization energy; I_2 , the second, etc.] This element most likely is:

- a. Na b. Mg c. Al d. Si e. P

18. The electron affinity of F is the energy associated with which of the following reactions?

- a. $F_2(g) \rightarrow 2F(g)$ b. $F(g) \rightarrow F^+(g) + e^-$ c. $F^+(g) \rightarrow F_2^+(g) + e^-$
d. $F(g) + e^- \rightarrow F^-(g)$ e. $F_2(g) + e^- \rightarrow F^-(g) + F(g)$

19. Which of the following is an alkali *metal*? a. H b. Ca c. Zn d. Fe e. Rb

20. Which of the following ions does not have the electronic configuration of argon, $_{18}\text{Ar}$?

- a. $_{17}\text{Cl}^-$ b. $_{19}\text{K}^+$ c. $_{20}\text{Ca}^{2+}$ d. $_{21}\text{Sc}^{3+}$ e. $_{9}\text{F}^-$

21. Which of the following is covalent? a. Li_2S b. MgO c. Al_2O_3 d. Bi_2O_3 e. P_2O_5

22. The bond in N_2 is a: a. double bond. b. single bond. c. triple bond. d. lone pair. e. none of these

23. Which of the following bonds is *most* polar? a. H-F b. H-Cl c. H-H d. F-F e. H-I

24. The number of valence shell electrons in chlorine is: a. 17 b. 2 c. 5 d. 7 e. 4

25. Which of the following IIIA family members should form the fluoride molecule with the highest lattice energy? a. AlF_3 b. GaF_3 c. InF_3 d. TlF_3 e. none of these

26. The number of bonds in the best Lewis structure of CS_2 (similar to CO_2) is: a. 1 b. 2 c. 3 d. 4 e. 5

27. The crystal lattice energy can be determined by means of a Born-Haber cycle, in which several reactions are combined according to Hess' Law. In applying this procedure to the lattice energy of KBr, the following reactions are combined:

(1)	$\text{K}(s) \rightarrow \text{K}(g)$
(2)	$1/2\text{Br}_2(l) \rightarrow \text{Br}(g)$
(3)	$\text{K}(g) \rightarrow \text{K}^+(g) + e^-$
(4)	$\text{Br}(g) + e^- \rightarrow \text{Br}^-(g)$
(5)	$\text{K}(s) + 1/2\text{Br}_2(l) \rightarrow \text{KBr}(s)$

For which of the above reactions is $\Delta H < 0$? a. All 5 reactions b. Reactions 2, 4 and 5
c. Reactions 4 and 5 d. Reactions 2 and 4 e. Only reaction 4

28. Which of the following will have the *largest* dipole moment?

- a. HF b. HCl c. HBr d. HI e. F_2