

Chemistry 121
Fall 2005
Test 2, **FORM A**

Instructions: You have 50 minutes to complete this 100-point exam. Indicate the test form on the Test Answer Sheet. All answers must be written on the Test Answer Sheet. You may use a simple scientific calculator. No programmable calculators allowed.

I. Multiple Choice (10 pts) Carefully and clearly circle the best answer on the Test Answer Sheet.

- Which of the following does not completely ionize in water?
 - HNO_3
 - H_2SO_4
 - $\text{Ti}(\text{OH})_2$
 - $\text{Ca}(\text{OH})_2$
- What is the molarity of a solution made by dissolving 0.50 mol of magnesium chloride in 0.10 L of water?
 - 0.05 M MgCl_2
 - 5.0 M MgCl_2
 - 0.05 M MgCl
 - 5.0 M MgCl
- What is the empirical formula of $\text{C}_{15}\text{H}_{39}\text{O}_{12}$?
 - CHO
 - $\text{C}_{15}\text{H}_{39}\text{O}_{12}$
 - $\text{C}_3\text{H}_{13}\text{O}_3$
 - $\text{C}_5\text{H}_{13}\text{O}_4$
- What is the percent yield of a reaction if the theoretical yield is 5.86 g and the actual yield is 4.29 g?
 - 1.37%
 - 25.1%
 - 73.2%
 - None of the above
- Which of the following is not a characteristic of a base?
 - Slippery
 - Corrodes metals
 - Has a bitter taste
 - None of the above

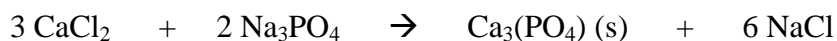
II. Reactions, Precipitates and Calculations: Show all work on the Test Answer Sheet. Partial credit will be given for correct work. If I cannot read the work, it will not be graded.

- (3 pts) What is (are) the product(s) of the reaction of a strong acid with strong base?
- (12 pts) Indicate whether or not the following compounds are soluble (SOL) or insoluble (IS).

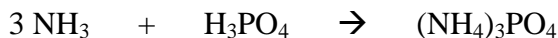
a. NaNO_3	c. PbBr_2	e. CoO
b. $\text{Sr}_3(\text{PO}_4)_2$	d. Li_2SO_4	f. $\text{Ni}(\text{C}_2\text{H}_3\text{O}_2)_2$
- (15 pts) Write the (a) Complete, (b) Ionic and (c) Net Ionic balanced equations for the reaction of iron (III) chloride with sodium phosphate.
- (15 pts) Write the (a) Complete, (b) Ionic and (c) Net Ionic balanced equations for the reaction of $\text{Mn}(\text{OH})_2$ (aq) with HNO_3 (aq).
- (10 pts) Calculate the molar mass of urea, $(\text{NH}_4)_2\text{CO}$.

11. (10 pts) A molecular compound contains 4.615 g of carbon and 0.385 g of hydrogen. What is its empirical formula?

12. (15 pts) What is the maximum weight of $\text{Ca}_3(\text{PO}_4)_2$ that can be obtained by mixing 2.00 L of 1.00 M CaCl_2 with 3.00 L of 0.500 M Na_3PO_4 ? (MM of $\text{Ca}_3\text{PO}_4 = 310. \text{ g/mol}$)



13. (10 pts) What volume (in L) of 0.755 M NH_3 is needed to exactly neutralize 2.50 L of 0.500 M H_3PO_4 ?



14. (10 pts) How many molecules of $\text{C}_2\text{H}_5\text{OH}$ are in 5.0 g of $\text{C}_2\text{H}_5\text{OH}$? (MM of $\text{C}_2\text{H}_5\text{OH} = 46.07 \text{ g/mol}$)

	IA																											VIIIA						
1	1																	2											2					
	H																												He					
	1.008																												4.00					
2	3	4																	5	6	7	8	9	10										
	Li	Be																	B	C	N	O	F	Ne										
	6.94	9.01																	10.81	12.01	14.01	16.00	19.00	20.18										
3	11	12											13	14	15	16	17	18																
	Na	Mg											Al	Si	P	S	Cl	Ar																
	22.99	24.31											26.98	28.09	30.97	32.06	35.45	39.95																
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36																
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr																
	39.10	40.08	44.96	47.90	50.94	52.00	54.94	55.85	58.93	58.71	63.55	65.37	69.72	72.59	74.92	78.96	79.90	83.80																
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54																
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe																
	85.47	87.62	88.91	91.22	92.91	95.94	[98]	101.1	102.9	106.4	107.9	112.40	114.8	118.7	121.8	127.60	126.90	131.30																
6	55	56	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86																
	Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn																
	132.9	137.3	175	178.5	181	183.9	186.2	190.2	192.2	195.1	197	200.59	204.4	207.2	209	[209]	[210]	[222]																
7	87	88	103	104	105	106																												
	Fr	Ra	Lr	[261]	[262]	[263]																												
	[223]	[226]	[262]	[261]	[262]	[263]																												
	57	58	59	60	61	62	63	64	65	66	67	68	69	70																				
	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb																				
	138.9	140.1	140.9	144.2	[145]	150.4	152	157.3	158.9	162.5	164.93	167.3	168.9	173																				
	89	90	91	92	93	94	95	96	97	98	99	100	101	102																				
	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No																				
	[227]	232	[231]	238	[237]	[244]	[243]	[247]	[247]	[251]	[252]	[257]	[258]	[259]																				