

Exam 3

Chem 1121

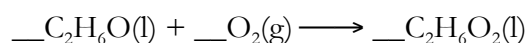
Fall 2009

Name: _____

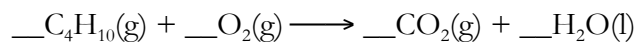
Show all work to receive credit.

Q1. [10 pts.] Balance the following equations using the lowest whole-number coefficients:

a) The oxidation of ethyl alcohol to acetic acid:



b) The combustion of butane:



c) The anaerobic fermentation of sugar:



Q2. [9 pts.] Convert the following masses to moles. Show ALL work!

a) 34.5 g urea, $\text{N}_2\text{H}_4\text{CO}$

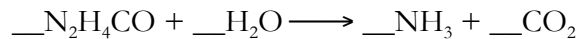
b) 24.4 g vitamin C, $\text{C}_6\text{H}_8\text{O}_6$

Q3. [5 pts.] How many moles of formaldehyde are in 24.5 mL of a solution whose molar concentration is 0.350 M? Show all work.

Q4. [8 pts.] A sample of gas with a pressure of 452 mmHg and a volume of 3.2 L is compressed until its new volume is 0.89 L. What will its pressure become? (Assume the temperature does not change.)

Q5. [8 pts.] A cylinder of hairspray with a pressure of 1.01 atm at a temperature of 15 °C is thrown onto a fire whose temperature is 581 °C. What will the pressure of the hairspray change to?

Q6. Urea breaks down via the following unbalanced chemical equation:



a) [4 pts.] Balance the chemical equation using the lowest set of whole number coefficients.

b) [4 pts.] How many moles of NH_3 are formed from the complete reaction of 3.4 mol urea, $\text{N}_2\text{H}_4\text{CO}$? Show all work. Be sure to use the conversion-factor (factor-label) method.

c) [8 pts.] How many grams of NH_3 can be formed from the complete break-down of 15.1 g urea, $\text{N}_2\text{H}_4\text{CO}$? Show all work. Be sure to use the conversion-factor (factor-label) method.

Q10. [1 pt.] What will happen if a red blood cell is added to a *hypotonic* solution?

[4 pts.] Explain why.

Q11. [9 pts.] What are the three steps involved in the dissolving of an ionic compound, such as NaCl? Draw pictures to illustrate.

i)

ii)

iii)

Q12. (i) [2 pts.] What is meant by the term: vapor pressure?

ii) [6 pts.] Sketch a graph of vapor pressure vs. temperature. Label your axes. Explain how you can use your graph to determine the *normal boiling point* of the substance it represents.

BONUS QUESTION:

Ringer's solution, used in the treatment of burns and wounds, is prepared by dissolving 8.6 g NaCl, 0.3 g KCl, and 0.33g CaCl₂ in water and diluting to a volume of 1.00 L.

What is the molarity of each component?

Useful Information

$$1 \text{ atm} = 760 \text{ mmHg} = 760 \text{ torr} = 101,325 \text{ Pa}$$

$$pV = nRT$$

$$P_1V_1 = P_2V_2$$

$$V_1/T_1 = V_2/T_2$$

$$P_1/T_1 = P_2/T_2$$

$$R = 0.08206 \text{ L} \cdot \text{atm/mol} \cdot \text{K}$$

$$T(\text{K}) = t(^{\circ}\text{C}) + 273$$

Periodic Table of the Elements

IA	IIA										IIIA	IVA	VA	VIA	VIIA	VIIIA	
1 1 H 1.01											13	14	15	16	17	18 2 He 4.00	
3 3 Li 6.94	4 4 Be 9.01											5 5 B 10.81	6 6 C 12.01	7 7 N 14.01	8 8 O 16.00	9 9 F 19.00	10 10 Ne 20.18
11 11 Na 22.99	12 12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 13 Al 26.98	14 14 Si 28.09	15 15 P 30.97	16 16 S 32.07	17 17 Cl 35.45	18 18 Ar 39.95
19 19 K 39.10	20 20 Ca 40.08	21 21 Sc 44.96	22 22 Ti 47.87	23 23 V 50.94	24 24 Cr 52.00	25 25 Mn 54.94	26 26 Fe 55.85	27 27 Co 58.93	28 28 Ni 58.69	29 29 Cu 63.55	30 30 Zn 65.39	31 31 Ga 69.72	32 32 Ge 72.61	33 33 As 74.92160	34 34 Se 78.96	35 35 Br 79.90	36 36 Kr 83.80
37 37 Rb 85.47	38 38 Sr 87.62	39 39 Y 88.91	40 40 Zr 91.22	41 41 Nb 92.91	42 42 Mo 95.94	43 43 Tc [98]	44 44 Ru 101.07	45 45 Rh 102.91	46 46 Pd 106.42	47 47 Ag 107.87	48 48 Cd 112.41	49 49 In 114.82	50 50 Sn 118.71	51 51 Sb 121.76	52 52 Te 127.60	53 53 I 126.90	54 54 Xe 131.29
55 55 Cs 132.91	56 56 Ba* 137.33	71 71 Lu 174.97	72 72 Hf 178.49	73 73 Ta 180.95	74 74 W 183.84	75 75 Re 186.21	76 76 Os 190.23	77 77 Ir 192.22	78 78 Pt 195.08	79 79 Au 196.97	80 80 Hg 200.59	81 81 Tl 204.38	82 82 Pb 207.20	83 83 Bi 208.98	84 84 Po [210]	85 85 At [210]	86 86 Rn [222]
87 87 Fr [223]	88 88 Ra** [226]	103 103 Lr [262]	104 104 Rf [261]	105 105 Db [262]	106 106 Sg [266]	107 107 Bh [264]	108 108 Hs [265]	109 109 Mt [268]	110 110 [269]	111 111 [272]	112 112 [277]	113 113 [285]	114 114 [285]	115 115 [289]	116 116 [289]	117 117 [293]	118 118 [293]
		57 57 La 138.91	58 58 Ce 140.12	59 59 Pr 140.91	60 60 Nd 144.24	61 61 Pm [145]	62 62 Sm 150.36	63 63 Eu 151.96	64 64 Gd 157.25	65 65 Tb 158.93	66 66 Dy 162.50	67 67 Ho 164.93	68 68 Er 167.26	69 69 Tm 168.93	70 70 Yb 173.04		
		89 89 Ac [227]	90 90 Th 232.04	91 91 Pa 231.04	92 92 U 238.03	93 93 Np [237]	94 94 Pu [244]	95 95 Am [243]	96 96 Cm [247]	97 97 Bk [247]	98 98 Cf [251]	99 99 Es [252]	100 100 Fm [257]	101 101 Md [258]	102 102 No [259]		