

PLEASE ANSWER IN THE SPACE PROVIDED. SHOW **ALL** WORK WHEREVER POSSIBLE- ESPECIALLY STOICHIOMETRIC FACTORS AND UNIT CONVERSIONS. THERE WILL BE ABSOLUTELY NO TALKING DURING THIS EXAM PERIOD. IF YOU HAVE A QUESTION, RAISE YOUR HAND. IF YOU FINISH EARLY, BRING YOUR EXAM TO ME AND LEAVE QUIETLY. DURING THE LAST TEN MINUTES OF THE EXAM PERIOD, DO NOT LEAVE YOUR SEAT AND DO NOT SPEAK TO OTHERS UNTIL ALL PAPERS HAVE BEEN COLLECTED. INITIAL EACH PAGE SO THAT IF THE PAGES BECOME SEPARATED I CAN PIECE YOUR EXAM BACK TOGETHER. USE A PEN. FILL YOUR STUDENT ID NUMBER IN THE SPACE PROVIDED. GOOD LUCK.

Selected equations, constants, and information:

$M_1V_1=M_2V_2$ ,  $1J = 1 \text{ kg m}^2 \text{ s}^{-2}$ , 4 qts = 1 gal, 1.057 qts = 1L, 4.184 J = 1 cal, 2.54 cm = 1 in, 2000 lbs = 1 ton, 5280 ft = 1 mile, 453.6g = 1.00lb, 12 = dozen, 101.325 kps = 1 atm, 1.00 troy oz. = 1.10 avoirdupois [ordinary] oz., 16.0 avoirdupois oz. = 1.00 avoirdupois pound,  $R=0.08206 \text{ L atm/K mol}$ ,  $1 \text{ atm}=29.92 \text{ in}=760 \text{ torr}=760 \text{ mm Hg}$

<b>Soluble compounds</b>	<b>Insoluble compounds</b>
compounds of Group 1 elements	carbonates, chromates, and phosphates, <b>except</b> those of the Group 1 elements and $\text{NH}_4^+$
ammonium compounds	
chlorides, bromides, and iodides, <b>except</b> those of $\text{Ag}^+$ , $\text{Hg}_2^{2+}$ , and $\text{Pb}^{2+*}$	sulfides, <b>except</b> those of the Group 1 and 2 elements and $\text{NH}_4^+$
nitrates, acetates, chlorates, and perchlorates	hydroxides and oxides, <b>except</b> those of the Group 1 and 2 elements**
sulfates, <b>except</b> those of $\text{Ca}^{2+}$ , $\text{Sr}^{2+}$ , $\text{Ba}^{2+}$ , $\text{Pb}^{2+}$ , $\text{Hg}_2^{2+}$ , and $\text{Ag}^{+***}$	

\* $\text{PbCl}_2$  is slightly soluble.

\*\* $\text{Ca}(\text{OH})_2$  and  $\text{Sr}(\text{OH})_2$  are sparingly (slightly) soluble;  $\text{Mg}(\text{OH})_2$  is only very slightly soluble.

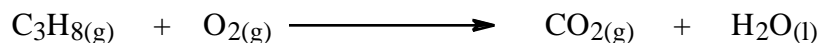
\*\*\*  $\text{Ag}_2\text{SO}_4$  is slightly soluble.



1) (5 pts) Place the most appropriate term in the space provided.

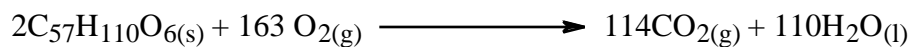
A \_\_\_\_\_ is the slow addition of a solution of one reactant to another until the stoichiometric point is reached. The solution being added is called the \_\_\_\_\_. At the stoichiometric point, an excess of \_\_\_\_\_ reactant is present. The \_\_\_\_\_ is often visualized by observing a change in the color of an \_\_\_\_\_.

2) (5pts) Small bottles of propane gas are sold in hardware stores as convenient, portable heat sources (for soldering, for example). The combustion reaction of propane is



What mass in grams of  $\text{CO}_2$  is produced from the combustion of 1.55 mol  $\text{C}_3\text{H}_8$ ?

3) (5pts) The camel stores the fat tristearin,  $\text{C}_{57}\text{H}_{110}\text{O}_6$ , in its hump. As well as being a source of energy, the fat is also a source of water, because, when it is used, the reaction



takes place. What mass of water is available from the oxidation of 2.5 kg of this fat?

- 4) (10pts) If 100.0 mL of a 0.10 M silver nitrate solution were mixed with 50.0 mL of a 0.250 M sodium chloride solution, what mass in grams of a solid would be formed? For full credit, give a complete, balanced chemical equation, identify the limiting reactant, and give the mass of solid in grams.