CHM 1311 C/E
Assignment 1: Sept. 13, 2007

name:_____
student number_____

mark: ___/4; ___/6: ___/2 = ___/12

This assignment is worth 1% of your final grade

Answer all questions in the space provided. Make sure to include all units in your final answer. Missing units in a final answer results in loss of 1 mark. Mathematical errors will result in loss of 1 mark to a maximum of 1 mark per question. Be legible – if we can't read it we can't mark it. Use ink on the copy you hand in.

Due date: please return to me in class on Tuesday, Sept. 18.

Question 1: Write the molecular and empirical formula for each of the following (4 marks).

0.5 each.

molecule	empirical formula	molecular formula
ethene $H_2C=CH_2$	CH_2	C_2H_4
ethanol CH_3CH_2OH	C_2H_6O	C_2H_6O
acetic acid CH_3CO_2H	CH_2O	$C_2H_4O_2$
glycine $NH_2CH_2CO_2H$	$C_2H_5O_2N$	$C_2H_5O_2N$

I don't care about the order

Question 2: Ethanol is oxidized to acetic acid according to the equation below. If 1 gram of ethanol reacts with 1 gram of O_2, what mass of acetic acid will be generated (6 marks)?

$$CH_3CH_2OH + O_2 \rightarrow CH_3CO_2H + H_2O$$

(1) To balance: $CH_3CH_2OH + 1O_2 \rightarrow CH_3CO_2H + 1H_2O$ (ie as written so they could skip this)

$1g\ C_2H_6O \times \frac{1\,mol}{46g} = 0.02\,mol$ (1 sig fig!) (1)

$1g\ O_2 \times \frac{1\,mol}{32g} = 0.03\,mol$ (1 sig fig!) (1)

$\therefore C_2H_6O$ is the limiting reagent (1), and based on stoichiometry

$0.02\,mol\ C_2H_4O_2$ made (1) $\quad 0.02mol \times \frac{60g}{mol} = 1g$ made (1 sig fig!)

Question 3: The radioactive element Californium, $^{240}_{98}Cf$, decomposes by the loss of an α-particle (^4_2He). What element (and isotope) results (2 marks)? (1)

$$^{240}_{98}Cf \longrightarrow {}^{236}_{96}Cm + {}^{4}_{2}He$$

(1) (1)