

NAME _____.

I. Organic reactions: Write out and name the compounds resulting from the following reactions. Name the starting organic substances also. (5pts each)

1.

_____.

2.

_____.

_____.

3.

_____.

_____.

4.

_____.

_____.

5.

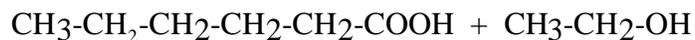
_____.

_____.

_____.

2. Predict and draw the products of the following reactions (don't need to name)(3 each):

a. esterification(acid catalyzed)



b. addition polymerization of (write at least two repeat units):

c. Condensation polymerization of nylon 3,3 write at least two repeat units):



II. Problems, etc.

1. (15 total)

a. Predict the pH of 2.00 liter of a 0.80 M formic acid / 0.10 M sodium formate solution.
The pK_a is 3.74(5)

b. What would the pH be if 0.10 moles of nitric acid were added to this 2.00 liters ?(5)

c. What would the pH be if this same amount of nitric acid to 2.00 liters of pure water.(5)

2.(15 pts) Answer the following:

a. What is the pH of a buffer made from 0.50 M acetate/ 0.16 M acetic acid? The pKa is 4.74.

b. What would the resulting pH be if you added enough solid KOH to 1.00 liter of the buffer so that $[\text{KOH}] = 0.10 \text{ M}$. (remember strong bases react completely with weak acids).

c. What would the pH be if this same amount of KOH was added to 1.00 liter of pure water.

3. For the following solutions what is : (show all calculations)(5each):

a. The $[\text{OH}^-]$ of human blood at a pH of 7.36?

b. The $[\text{H}_3\text{O}^+]$ of 6.0 M HCl?

c. The $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$ of absolutely pure distilled water?

d. The pH of 3.2 M HCl ?

4. Name a substance which could be used to neutralize acidic waste water. Write a balanced ionic equation for the reaction of this substance with nitric acid.(3)

III. Nomenclature, etc

1. Name or draw the following compounds.(1.5 each)

a. *cis* 2-heptene

b. 2-butanol

c.

d.

e

2. Name the circled functional groups in the molecules below (2each).

1. _____

2. _____

3. _____

4. _____

5. _____

BONUS

2 pt) Draw a (reasonable) molecule which has a *chiral* center and circle that center.

2. 5 pt)for the solution in Problem 1a: Predict the pH resulting from adding 10. g of $\text{Ca}(\text{OH})_2$ (a strong base) to the 2.0 liters. (show work or no credit). At Wt. Ca=40.1, O=16.0, H=1.01.