Results #6—Polymer Synthesis Name _____

Lab day: M T W Th F

- Put your answers in the blanks provided.
- Use correct significant figures.
- **Attach calculations**.
- ***Attach 2 spectra*** **(nylon 6.6 [your nylon spectrum should also be in your lab notebook] and your unknown)**.

Part 1

1. Calculate the number of moles of hexamethylenediamine _____ and adipoyl chloride _____ used in your synthesis of nylon 6.6.
2. Which compound was the limiting reactant? _____
3. Calculate the theoretical yield in grams. To do this you do not need to know the molecular mass of the polymer. First, calculate the molecular mass of the repetitive monomer unit of the polymer: _____. Then multiply this number by the number of moles of the limiting reactant. Theoretical yield: _____
4. What was your actual yield of nylon 6.6 in grams? _____
5. Calculate your overall percent yield for your synthesis of nylon 6.6. _____
6. Using your IR spectrum, identify the wavelength of peaks that are in the predicted absorption ranges for Nylon 6.6 in the table below:

Predicted Absorption Ranges (cm^{-1})	Type of Vibration causing IR absorption	Measured Absorption (cm^{-1})
3500-3300	N-H Stretch of Amide	
3000-2850 (Several bands)	H-C-H Stretches of Alkane (You can just list one band)	
1700-1625	C=O Stretch of Amide	

CONTINUED →

Name _____

Part 2

1. What was your unknown letter for your unknown piece of plastic? _____
2. Using Table 3 from the lab manual, identify your unknown. _____
   Focus on the largest peaks in your spectrum.
3. Fill the table below with the predicted and measured peaks from your IR spectrum. First, identify your uknown. Next, use Table 3 from the lab manual to fill in the predicted absorption ranges and types of vibrations for the polymer that you think you have. Finally, fill in the measured absorption peaks in the predicted ranges.

Predicted Absorption Ranges (cm^{-1})	Type of Vibration causing IR absorption	Measured Absorption (cm^{-1})