STEP 1: ADC Simulation and Testing
Worksheet

Section: _____ Group No.: _____ Grade: _____/10

Name(s): _____

1. **Briefly explain why $\overline{\text{INTR}}$ and $\overline{\text{WR}}$ is tied together in CFR (Continuous Free Running Mode).**

2. **Why is $\overline{\text{RD}}$ and $\overline{\text{CS}}$ connected to ground in CFR?**

3. **What purpose does the button in CFR serve to do?**

4. **What does the LEDs being ACTIVE LOW mean? Why are they configured this way? Provide any relevant numerical value(s). HINT: Look at the SINK and SOURCE current in the datasheet.**

5. **With the overall project in mind, what is THE most important information you considered in choosing the sampling frequency? Provide an external reference and any relevant numerical value(s). HINT: Remember, that you are building an audio recorder for the HUMAN VOICE.**

6. **What limitations on the ADC do you need to consider when picking your sampling frequency? Provide any relevant calculations and/or numerical value(s). HINT: Look at the datasheet.**

7. **What did you choose as the sampling frequency? Why? What are the advantages and limitations of you picking this frequency? HINT: Consider Nyquist/Shannon's Theorem when picking your sampling frequency.**

8. **Show/explain all the work you did in order to calculate the timing resistor and capacitor. Be sure to explain how you determined the CCPS (Clock Cycles Per Sample) used in your calculation.**

9. **What factors determine the voltage resolution on an ADC? Can those factors be changed on a given ADC to improve the resolution? If not, why?**

10. Compare your calculated/desired sampling and clock frequency with your measured ones. Is the discrepancy significant and what would cause it?

11. Briefly explain why/how the ramp produces a "counting" effect on the digital outputs/LEDs.