

EE 3921

Dr. Johnson

Homework 12

1a – What is the minimum acceptable sample rate for a 20KHz band limited signals with – 20 pts

Resolution and Vref do not impact the answer
20KHz BW requires a minimum of 40KHz sample rate to meet the Nyquist criteria

4 bit A/D

8 bit A/D with a 2.5V Vref

12 bit A/D with a 1.2V Vref

1b – Assuming a 16 bit A/D converter, with a Vref = 2.5V, determine the output code for each input voltage below – 20 pts

	16 bit 2.5v → 38.147uv/bit
12mV	314
600mv	15,728
1.5v	39,321
2.2v	57,671
2.55v	Overflow – 65,535

2 – Run the ADC toolkit example from the ADC lecture but using a sine wave input equal to the last digit in your ID * 1KHz (e.g. if last digit is 3, use a 3KHz sine wave input). Provide the ADC toolkit waveform - 60 pts