## **Pulse Code Modulation - Preparation**

• Name:	Lab Date:	
• Student No.:	Day of the week:	Time:

1. *Explain, with sketches in time and frequency domain, the process of sampling a band-limited signal. Suppose that the signal is sampled by an impulse train. What are the limits imposed by the sampling theorem?* 



2. What is the consequence of sampling a signal at a rate lower than twice the highest frequency present on its spectrum? Sketch a frequency domain figure to illustrate your explanation.





3. Illustrate how to reconstruct a signal from its sampled representation.

4. Sketch the frequency domain representation of a 22KHz sine wave sampled at  $f_s = 8KHz$ , assuming you do not have an anti-aliasing filter. What do you see between DC and  $f_s/2$ ?



5. Sketch the process of sampling and quantization for a 1KHz sine wave sampled at 8KHz. You are to use a 3 bit quantizer and assume linear quantization. Use your illustration to explain quantization noise.

