Worksheet:
Introduction to Analogue to Digital Conversion

1. A video signal is to be quantized into 60 discrete voltage intervals using a flash ADC. How many high speed comparators will be needed to implement this flash ADC?

2. Explain what has to be done to convert this video signal to binary form from the output of the flash ADC.

3. How many bits of information can be obtained from 60 discrete voltage intervals?
   Hint: An n bit signal has $2^n - 1$ quantization levels.

4. What are the advantages and disadvantages of a flash ADC. Name another ADC that can be used if the advantages of a flash ADC are not needed.

5. What is the ladder network used for in a flash ADC?

6. A quantization step in an ADC is 0.5mV and the highest convertable input signal value is 5V. What is the dynamic range of this ADC (to the nearest integer dB)?

7. The output of an ADC is binary represented with 10 binary bits. What is the dynamic range of this ADC (to the nearest integer dB)?

8. How many comparisons will a SAR in an 8 bit Successive Approximation ADC require to complete a conversion?

9. Two ADCs with the following two different specifications have been provided:

Device Number	Numer of bits	Conversion Rate
MAX11102	12 bits	3Msps
MAX108	8 bits	1.5Gsps

   Which ADC is likely to be a flash ADC and which is likely to be a SA ADC?

10. How many colours are available for a television representing colours with 8 bits for each of three colour channels: Red, Green and Blue?