For all problems below assume you are using a MCU with a 24 MHz bus clock and a 8 MHz oscillator clock.

(15) 1. Write some code to enable the A/D converter, put it into a 10-bit mode, 1 MHz conversion frequency, and convert the analog inputs on pins PAD0 through PAD7 continuously.

(15) 2. The following analog signal is to be samples with the HCS12 ATD subsystem. What sampling frequency should be used? Why?
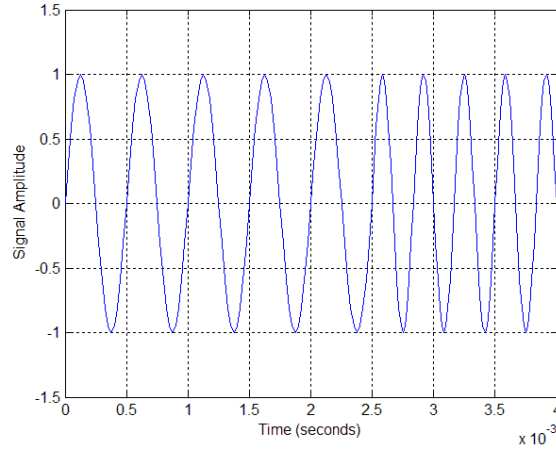

(15) 3. Is it possible to sample a 500 KHz signal with the HC12? Why?

(15) 4. On an HCS12, VRL is connected to 1 V, and VRH is connected to 4 V. The A/D converter is set up to do 8-bit conversions.

(a) What voltage step will cause the A/D converter to change value?

(b) If the result of a conversion is 0xEF, what was the input voltage to the A/D converter?

(15) 5. The TC1047 is a temperature sensor whose output is directly proportional to the measured temperature, as shown in the following figure. What is the smallest temperature change which can be measured, assuming that the HCS12 is sunning at the maximum resolution possible?
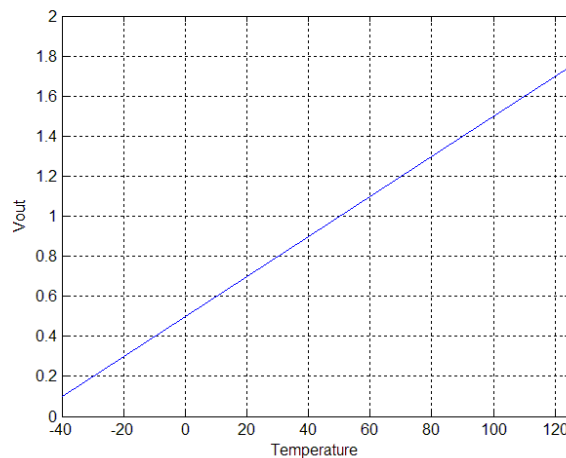
(15) 6. Write some C code to set up the SPI subsystem in the following mode: (a) HCS12 is the master, (b) No interrupts, (c) SCK idle low, data valid on the rising edge of clock, (d) MSB is sent first, (e) SCK frequency is 250 kHz.

(15) 7. Explain how the SPIF is set, and how to clear it.