Answers to Self-Test Questions

Tutorial 6: Analog to Digital Conversion

1.	The TMS320F243 has physically only one analog-to-digital converter (ADC). However, for compatibility with other devices in the family, there are two sets of control registers.
2.	When the TMS320F243 powers up, the ADC is off. Therefore, in order to measure an analog input, the ADC must first be turned on.
3.	The register ADCTRL1 is not dedicated solely to ADC1 and the register ADCTRL2 is not dedicated solely to ADC2. The functionality for both ADCs is shared between the control registers ADCTRL1 and ADCTRL2.
4.	The *enable* bit of the register ADCTRL1 is used to connect the analog-to-digital converter to the internal circuitry. The *start conversion* bit initiates a measurement or measurements.
5.	The analog-to-digital converter of the TMS320F243 has eight input pins. Here the term *channel* means the pin whose input voltage is being measured.
6.	The result of an analog-to-digital conversion, as found in ADCFIFO1 or ADCFIFO2 left justified. This gives more resolution and simplifies any subsequent multiplication for scaling.
7.	a) SFR ; Missing operand. b) SFR 1 ; Correct syntax. c) SFR −1 ; Incorrect. Operand must be positive.
8.	The instruction SFL (shift left) is the same a multiply by 2.
9.	The instruction OR #3, 4 takes the value 0003h, shifts it four places to the left, then loads this value (0030h) into the accumulator. The important point is that the shift is done before the accumulator is loaded.
10.	The maximum value that ADCFIFO1 or ADCFIFO2 can contain is FFC0h. This is 3FFh (1024 decimal) shifted 6 places to the left.
11.	The minimum value that ADCFIFO1 or ADCFIFO2 can contain is zero.
12.	When we use the directive .set with a value greater than 7Fh, we use the symbol # to indicate an immediate value. If the symbol # is not used, then the value is truncated if greater than 7Fh. This is because a direct address can only use values in the range 0 to 7Fh.
13.	If we were to write the value #0C01h to ADCTRL1, it might read back as 0D80h. This is because some of the fields give the status of the ADC, and can therefore take different values.