a. Assume a PIC is drawing 15 mA current at 5 V, 40 MHz. What would be the expected current draw if the frequency/voltage is reduced to 4 V/20 MHz?

\[ I_{dd} \sim V_{dd} \times V_{dd} \times F \times C \]

\[ C = \frac{I_{dd}}{(V_{dd} \times V_{dd} \times F)} = \frac{15 \text{ mA}}{(5 \times 5 \times 40 \text{ Mhz})} \]

2nd data point:

\[ I_{dd} = 4 \times 4 \times 20 \text{ MHz} \left[ \frac{15 \text{ mA}}{(5 \times 5 \times 40)} \right] = 15 \text{ mA} \left(\frac{8}{25}\right) = 4.8 \text{ mA} \]

b. Write C code that puts the PIC to sleep.

\[
\text{asm ("SLEEP") --- assembly language instruction}
\]

c. Explain the FUNCTIONAL difference between a watchdog-timer WAKEUP and a WATCHDOG timer RESET. When does one OCCUR versus the other? What is the difference in terms of the next instruction that is executed?

**WDT Wakeup** – happens when PIC is asleep and WDT expires. Next instruction after SLEEP instruction is executed.

**WDT Reset** – happens when the PIC is in normal execution, and the WDT expires. This forces a reset, which means the next instruction executed is at location 0x0000.