

ECE 3724 Quiz #9 – Fall 05 - Reese

NAME: _____

Answer each of the following questions. For any required I2C functionality, use subroutine calls *i2c_start()*, *i2c_rstart()*, *i2c_stop*, *i2c_put(char byte)*, *char i2c_get(char ackbit)*. If you use *i2c_put*, you must pass in as an argument the byte that is to be written to the I2C bus.

- a. Assume I have a periodic interrupt with PRE=4, POST = 10, and PR2 = 50. If I change these to PRE= 16, POST =5, and PR2 = 50, what is the relationship of the new interrupt period to the old interrupt period?

$$\begin{aligned} \text{New Period/ Old period} &= [\text{new (PRE * POST * (PR2+1))}] / [\text{old (PRE * POST * (PR2 + 1))}] \\ &= [16 * 5 * (50+1)] / [4 * 10 * (50+1)] \\ &= 2 \end{aligned}$$

New period is twice as long as old period

- b. Write a series of I2C calls that will write the value 0xF3 to location 0x9025 in the LC515 serial EEPROM.

```
i2c_start(); // bsel A1 A0 R/W
i2c_put(0xA8); //i2c addr byte 1 0 1 0 1 0 0 0 assume A1,A0 tied low, select upper block
i2c_put(0x90); // this byte could also be 0x10 since the upper bit is a don't care
i2c_put(0x25);
i2c_put(0xF3); // value to be written to 0x9025
i2c_stop();
```

- c. Write a series of I2C calls that will cause a voltage of 2 V to appear on the output of the 517 DAC assuming a Vref of 5 V.

Translate 2V into 8-bit code: $2V/5V * 256 = 102$

```
i2c_start(); // A1 A0
i2c_put(0x58); //i2c addr byte 0100 1 0 0 0 assume A1,A0 tied low
i2c_put(0x00); // command byte that says do the conversion
i2c_put(102); // 8-bit value to be converted
i2c_stop();
```

- d. Assuming a VREF of 5V, if upper 8 bits of the PIC18 DAC returns as 0xC0, what is the input voltage?

$$V_{in} = \text{ADC Code} / 2^N * V_{ref} = 0xC0 / 2^8 * 5 \text{ V} = 192 / 256 * 5 \text{ V} = 3.75 \text{ V}$$