ECE 3724/CS 3124 Sample Quiz #7 – I2C and Interrupts - Reese

NAME: _____

Answer each of the following questions:

a. Draw the waveform for a I2C START condition.
b. Draw the waveform for an I2C STOP condition.
c. How many bit times is required for a 'current address read' on the 24LC515 read.
d. If A1 = '1', and A0 = = '1', what is the 24LC515 device address for a READ command?
e. What are the responsibilities of an interrupt service routine (ISR)?
f. Where is the ISR located in PIC memory?
g. What is the functional difference between a RETURN instruction and a RETFIE instruction?
h. Assuming that serial IO has been initialized in a non-interrupt mode, list ALL of the bits (and registers) that must be changed in order to enable an asynchronous receive interrupt.
i. Write a C subroutine that will perform a STOP condition (you do not have to check for IDLE).
j. Write a C subroutine that will perform a START condition (you do not have to check for IDLE).
k. Write a C subroutine that will write a byte to the I2C bus (you do not have to check for IDLE).
l. Write a C subroutine that will read a byte from the I2C bus (you do not have to check for IDLE).
m. Draw the I2C connection between a PIC and an I2C device and label the appropriate pin names and draw any external components required for correct functionality.
n. Assuming a 10 Mhz crystal frequency, what value must be written to SSPADD register to achieve a 200 KHz I2C clock frequency?
o. What is the advantage of the I2C bus over the Serial Peripheral Interface (SPI)?
p. Assuming only the I2C functions of i2c_start(), i2c_putbyte(), i2c_getbyte(), i2c_stop , list the function calls required to implement a random-address read on the 24LC515 serial EEPROM.
q. How many bit times does it take to implement a PAGE write to the 24LC515 serial EEPROM?
r. Use the terms full-duplex, half-duplex, simplex, bi-directional, uni-directional to classify the individual CONNECTIONS and COMMUNICATION CHANNEL provided by the I2C bus.
s. Use the terms full-duplex, half-duplex, simplex, bi-directional, uni-directional to classify the individual CONNECTIONS and COMMUNICATION CHANNEL provided by the SPI port.