Student Name:_____ Student ID: _____

Problem 1

A multi purpose sensor is connected to the HCS12 through an SCI port and repeatedly (1 time every 5 seconds) sends two bytes of data to the microprocessor: 1) temperature (unsigned byte), and 2) humidity (unsigned byte).

Write a polling subroutine that will wait for each byte to arrive and store the values in locations $2000 and $2001 respectively.

Assume the circuit is initialized and is working correctly to interface with the sensor (i.e. correct baud rate, parity, etc.).

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Problem 2

A section of the main program is running shown below and is in the middle of executing the inx instruction when a RTI periodic interrupt occurs. The ISR is shown in below as well. Fill out the table describing register and memory values at different points throughout the sequence. (Hint: create your own intermediate columns).

MAIN CODE

```
---------------------------------------
clra
inca
inx              <-- IRQ occurs here
ldy    $2000
```

ISR

```
-----------------------------------
rti_isr:  ldaa   $3000
          ldab   $3001
          mul
          std    $2000
          rti
```

Table 1

Location	Prior to CLRA	Just Prior to RTI	Just after LDY
reg A	$04		
reg B	$08		
reg D			
reg X	$3000		
reg Y	$0000		
Mem $2000	$03		
Mem $2001	$02		
Mem $3000	$04		
Mem $3001	$02		

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Problem 3

Write a subroutine to initialize the PWM peripheral with three active channels:

1) **Channel 0 running at 100 Hz and 90% duty cycle**

2) **Channel 2 running at 10 KHz and 50% duty cycle**

3) **All other channels (1, 3-7) should be disabled.**

Show all calculations and ensure values with 4% tolerance.