EE 308

Exam 1

February 18, 1999

Name: _____

You may use any of the Motorola data books. No calculators allowed. Show all work. Partial credit will be given. No credit will be given if an answer appears with no supporting work.

1. Fill in the blanks in this table.

Hex	Binary	Unsigned Decimal	Signed Decimal
C5			
	01101011		
			-37
		37	

2. The following operations are done in accumulator A of an HC12. . Indicate the answer in accumulator A, and the state of the flags after the operations.

	B8 + 93	47 + 7B	CB + 35	D2 - 84	57 - D9
Acc. A					
C					
V					
N					
Z					

3. Below are some data in the HC12 memory:

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0800	D6	05	35	CF	E0	00	FE	08	20	A6	00	47	6A	05	08	53
0810	26	F7	34	C6	C8	CD	9C	40	03	26	FD	53	26	F7	3D	3F
0820	07	C2	3A	68	F3	09	C2	67	9A	0F	AA	55	08	40	CD	CF

Reverse assemble the first seven instructions, starting at address 0x0800. Write down the mnemonic and operand for the instructions. Indicate the addressing mode used. Also indicate the effective address – that is, the address in memory which the instruction will use to fetch or store the number it is working on. Assume the registers initially have the following values:

```
A = $55, B = $AA, X = $1234, Y = $5678, SP = $0823, PC = $0800
```

I have done one instruction for you.

Instruction Address	Mnemonic	Operand	Addressing Mode	Effective Address
0x0800	`ldab`	`$05`	DIR	`$0005`

4. Using the same data in the HC12's memory as in Problem 3, indicate the values in the registers after the HC12 executes the following instructions. Also write down the number of cycles needed to execute each instruction. Show what will be in the registers (in hex) after each of the instructions. If the instruction does not change a register, you may leave that entry blank.

Instruction	D		X	Y	SP	N	Z	V	C	Addressing Mode	Cycles
	A	B									
	AA	25	0810	0000	0820	1	0	0	1		
`ldx #$0808`											
`ldy $0808`											
`ldaa -5,x`											
`sba`											
`pulx`											
`comb`											

5. Using the same memory as for Problem 3, show what will happen to the program counter and stack pointer when you execute the following instruction:

```
rts
```

	PC	SP
Before	`$081E`	`$0825`
After		

6. Write an assembly language program which will do the following: set up bits 2 through 0 of Port A as inputs, and bits 7 through 3 of Port A as outputs. Set up Port B as an output port. If bit 2 of Port A is high, write an 0x55 to Port B. If bit 2 of Port A is low, write an 0xFF to Port B. Then exit back to D-Bug12. Make sure this is a complete assembly language program, and is placed in RAM inside the HC12's memory.