

Student Name: _____ Student ID: _____

Show work with intermediate steps. Showing only the answer will get no credit.

Problem 1 – 30 points

Assume “*pshd*” is the next instruction in line and is executed with the initial values shown in the table below.

a – Fill in all blank entries in the table before and after the execution of the instruction.

	Initial Value (before execution)	Final Value (After execution)
Accumulator A	\$12	
Accumulator B	\$34	
Accumulator D		
Accumulator X	\$1000	
Stack Pointer (SP)	\$1004	
Accumulator Y	\$1002	
Bit N of CCR	0	
Bit Z of CCR	0	
Bit C of CCR	0	
Bit V of CCR	0	
Memory \$1000	\$80	
Memory \$1001	\$00	
Memory \$1002	\$FF	
Memory \$1003	\$FE	
Memory \$1004	\$FC	
Memory \$1005	\$FE	
Memory \$1006	\$FD	

b - Give one reason (10 words or less) why someone would use this instruction.

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Problem 2 30 points –

- a) Provide the machine code (hand assemble) the instruction **std [\$1000,X]** followed by an **inca** instruction (15pts) by filling out the table below. Assume the instruction starts at location \$1000. (Note: not all locations below may be necessary in which case leave them blank).

Address	Contents
\$1000	
\$1001	
\$1002	
\$1003	
\$1004	
\$1005	
\$1006	
\$1007	
\$1008	

- b) Given the contents of eeprom below and assuming the contents are instructions, create (hand dis-assemble) the corresponding assembly program (15pts).
Hint: more than one instruction is encoded below. Boundaries are important. The instructions are contrived so don't look for them to do something reasonable.

Address	Contents
\$0C00	\$53
\$0C01	\$EE
\$0C02	\$EF

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Problem 3– 40 points

The following subroutine takes a number in register A and provides a result in register Y.

```
; calling sequence
; lda #$FC
; jsr signex
```

```
signex:      psha
             pshb
             tab
             bmi  negative
positive:    clra
             xgdy
             bra  done
negative:    ldaa #$FF
             xgdy
done:        pulb
             pula
             rts
```

	Initial value	Just before pulb	After rts
Register A	\$FC		
Register B	\$55		
Register D			
Register X	\$1000		
Register Y	\$3000		
Memory \$1000	\$70		
Memory \$1001	\$6F		
Memory \$1002	\$70		
Memory \$1003	\$7A		
Memory \$1004	\$78		
Memory \$3000	\$79		

- Fill in all blank entries in the table above including initial for the D register.
- 2 point bonus – This function was used in a final project several semesters ago. Why would you do this (10 words or less)?