

You have fifty minutes to complete this test.

Problem 1: Consider the following assembly-language program.

- 25 Starting values: [A] = \$05, [B] = \$00, [\$C300] = \$02, [\$C301] = \$06
 (Hint: [\$C300] means “contents of memory location \$C300”.)

```

        ADDA    $C300      A    B    (300    C301
        STAA    $C300      7
        LDD     #C300      C3    60      7
        BEQ     X1
        STAA    $C301
X1:     STAA    $C300      C3    C3
        WAI
    
```

*Did \$C300
 instead of #C300
 B
 6*

What values are in A, B, memory location \$C300, and memory location \$C301 when the program finishes?

[A] = C3 [B] = 00 [\$C300] = C3 [\$C301] = C3

~~4 pts each~~
 6 each

- 25 Problem 2: Match the instructions to their description.

- a. Performs a subtraction but does not store the result.
- b. Takes the logical inverse of a number.
- c. Performs a right-shift operation.
- d. Branches if the Z flag is set.
- e. Returns from a subroutine.
- f. Returns from an interrupt service routine.
- g. Sets the “Carry” flag.

- D BEQ
- E RTS
- B COM
- F RTI
- G SEC
- C ASR
- A CMP

3 ea.

- 25 Problem 3: Answer the following short questions

- 7 a. A static RAM has a 10-bit address bus and an 8-bit-wide data bus. How many bits of data does it contain?

$$2^{10} \times 8 = 2^{13} = 8K \text{ bits} = 8192 \text{ bits}$$

- 8 b. What is the advantage of EPROM over PROM?

It's erasable & therefore reusable/reprogrammable

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1

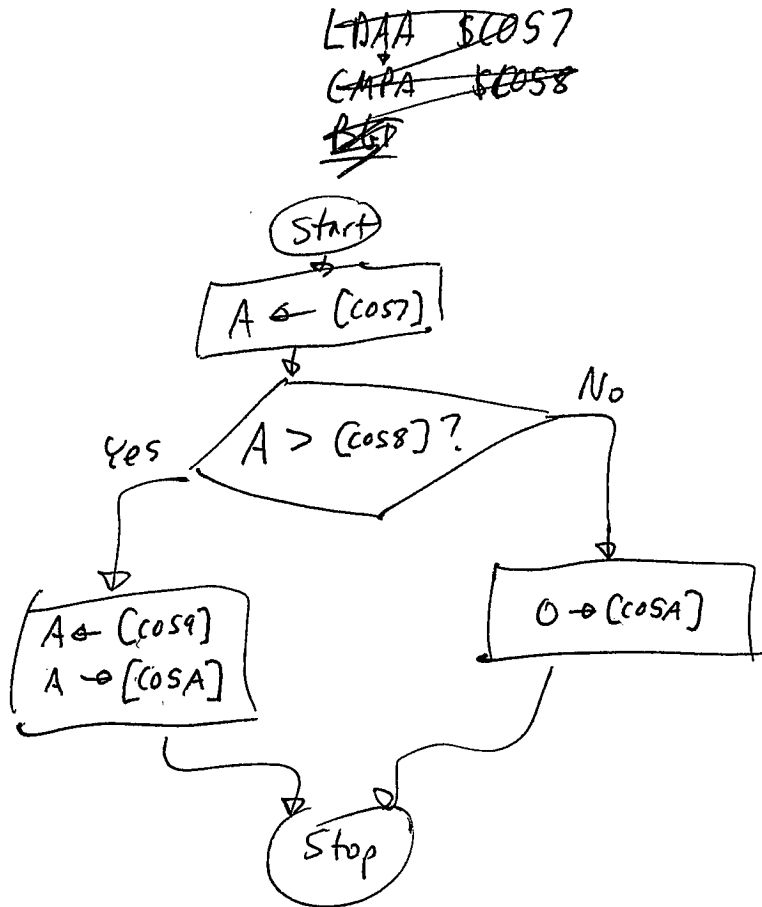
c. Which volatile memory technology is denser (has more bits per unit area), SRAM or DRAM?

8

DRAM

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Problem 3: Draw a flowchart for the following:
 Memory locations \$C057 and \$C058 contain *unsigned* data. If [\$C057] is greater than [\$C058], then copy [\$C059] to [\$C05A]. If not, then clear memory location \$C05A. (As above, [\$C057] means "the contents of memory location \$C057".)



used X/Y 'stead of A/B -6

Did not copy C059 to C05A -8

Skipped "how to" compare + copy -7

"Compare X ≠ Y" (in addition to not using A/B) -3 add'l

weird instr -5

unterminated -5