

**Computer Architecture ECE314**  
**Winter 2006 Test 2**

1. Identify the following terms or abbreviations (2 points each)
  - (a) ASM
  - (b) chip select (CS)
  - (c) EEPROM
  - (d) gated clock
2. Explain the difference in how information is stored in dynamic RAM compared to static RAM? (4 points)
3. What additional operation(s) must be performed for dynamic RAM that is not necessary for static RAM? (4 points)
4. Find the value  $R1 \leftarrow R2 \text{ sl } 3$  if  $R2 = 01011001$ . (3 points)
5. How many kilobytes or megabytes of memory are available in a RAM with a 12-bit address and 16-bit output? (4 points)
6. How many 128K \* 8 bit RAM chips are necessary in order to construct 8 M \* 32 bit memory? (4 points)
7. Describe at least four kinds of memory (or storage) and rank them by capacity and/or access time. (4 points)
8. Give an example of each of the following kinds of microoperations. (3 points)
  - (a) arithmetic
  - (b) logical
  - (c) shift

9. Name and describe the function of the following registers (e.g. ACC is the accumulator) (2 points each)

(a) ACC

(b) PC

(c) IR

(d) MAR

(e) MDR

10. Identify the three states found in the operation cycle of most computers. (3 points)

(a) F \_\_\_\_\_

(b) D \_\_\_\_\_

(c) E \_\_\_\_\_

11. Draw a diagram of a datapath consisting of a register file and a function unit. The function unit accepts bus A and B as inputs and outputs to bus F. Bus F and register MDB (memory data buffer) go to a multiplexor with bus D as output. Bus D provides inputs to the register file. (6 points)

12. What microoperation(s) would you use to transfer the last three bits of R2 into R3? All other bits of R3 should be zero. Express your answer as a register transfer. (2 points)



18. What is the hex value in memory address F at the end of execution? Show your reasoning at each step for partial credit. (8 points)

```
Start, Load B
      Add D
      Store E
      Load A
Loop,  Add K
      Subt E
      Skipcond 800
      Add B
      Store F
      Subt C
      Skipcond 000
      Jump Loop
      Halt
A,    Hex 2A
B,    Hex 1B
C,    Hex D
D,    Hex 4
E,    Hex 12
F,    Hex 0
K,    Hex 3
```