Code No: A109211202 **R09** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
DIGITAL LOGIC DESIGN AND COMPUTER ORGANIZATION
Information Technology

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Draw the block diagram of a quadruple 2-to-1 line multiplexer and explain its operation using function table.
   (b) What is a shift register? With a neat diagram explain the operation of a 4-bit shift register. [7+8]
2. (a) Differentiate between RISC and CISC.
   (b) What are weighted codes? Explain with examples.
   (c) Convert the hexadecimal number F3A7C2 to binary and octal. [6+5+4]
3. With an example explain how division of two fixed point binary numbers when negative numbers are in signed-magnitude representation. [15]
4. (a) Discuss Pentium III caches in detail.
   (b) Explain how data can be organized and accessed on a disk. [8+7]
5. (a) Describe the full set of IA-32 addressing modes.
   (b) Give the format of status register of IA-32 and explain each of the flags. [10+5]
6. (a) With a neat diagram explain single-bus organization of the datapath inside a processor.
   (b) Give the steps required to execute Move R2,(R1). [9+6]
7. (a) "An interrupt is more than a simple mechanism for coordinating I/O transfers." Justify the statement.
   (b) Draw the general 8-bit parallel interface and explain its working. [6+9]
8. (a) Draw the multiple-level NAND circuit for the following expression:
   (AB' + CD')E + BC(A + B).
   (b) Simplify the following Boolean function F, together with the don't-care conditions d, and then express the simplified function in sum of minterms:
   $F(x,y,z) = \Sigma\ (0,1,2,4,5)$
   $D(x,y,z) = \Sigma\ (3,6,7)$. [5+10]

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Code No: A109211202 **R09** **Set No. 4**

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Information Technology

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain each of the following:
   i. Page fault
   ii. Page table
   iii. Page replacement
   iv. Translation lookaside buffer.

   (b) Draw the block diagram of a typical SDRAM chip and explain. [8+7]

2. Draw the flowchart for division of two fixed point numbers when negative numbers are in signed-magnitude representation and explain with an example. [15]

3. (a) Draw block diagram of typical daisy-chain priority interrupt scheme and explain its operation.

   (b) Discuss in detail the USB architecture. [8+7]

4. (a) Explain in detail with a neat diagram the three-path organization of the datapath.

   (b) What is the reason for slower operating speed of microprogrammed control? Suuggest solutions to achieve faster operation. [9+6]

5. (a) Explain with an example how 2^n-to-1 multiplexer is constructed from a n-to-2^n decoder.

   (b) Draw the circuit diagram of a Binary counter and explain its working principles. [7+8]

6. (a) What is the unique characteristic of the XOR gate? Draw the combination of AND, OR and NOT gates to provide the XOR function.

   (b) Simplify the following Boolean functions, using three-vaiable maps:
   i. F(x,y,z) = Σ (0,2,6,7)
   ii. F(a,b,c) = Σ (0,1,2,3,7). [7+8]

7. (a) How strings are stored in memory? What are the two ways of indicating the length of the string?

   (b) Write an IA-32 routine to pack two BCD digits into a Byte and explain. [7+8]

8. (a) What are the different types of information handled by a computer? Explain.

   (b) Formulate a weighted binary code for the decimal digits using weights 6,3,1,1. [7+8]

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Code No: A109211202 R09 Set No. 1

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Time: 3 hours Max Marks: 75

Answer any FIVE Questions
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1. (a) Compare the characteristics of a floppy disk and a hard disk.
   (b) Discuss in detail memory interleaving. [8+7]

2. (a) Explain various functional units of a computer.
   (b) i. Convert AF3B to binary
       ii. Find the 2's complement of the result in (i)
       iii. Convert the answer in (i) to hexadecimal. [9+6]

3. (a) Draw the truth table of a four-input AND gate and realize it using 2 input AND gates.
   (b) Simplify the Boolean equation Y = AB'C'+A'BC'+AB'C'+ABC' and realize the logic circuit. [6+9]

4. (a) Write the algorithm for adding and subtracting numbers in signed-2's complement representation.
   (b) Show that adding B after the operation A+B'+1 restores the original value of A. What should be done with the end carry? [7+8]

5. (a) Implement the following Boolean functions with a PLA:
   $F_1(A,B,C) = \Sigma\ (0,1,2,4)$
   $F_2(A,B,C) = \Sigma\ (0,5,6,7)$.
   (b) Design a 4-bit binary synchronous counter with D flip-flops. [8+7]

6. (a) Write the control sequence for execution of the instruction ADD (R3), R1 for the single bus architecture.
   (b) Give the ways to reduce the number of bits in microinstruction. [8+7]

7. (a) With an illustration explain how the program for C ← [A] + [B] is executed.
   (b) Consider a computer that has a byte-addressable memory organized in 32-bit words according to the big-endian scheme. A program reads ASCII characters entered at a keyboard and stores them in the successive byte locations, starting at location 1000. Show the contents of the two memory words at locations 1000 and 1004 after the name "Johnson" has been entered. [7+8]

8. (a) What is an exception? Explain different types of exceptions.

(b) What is the disadvantage of the strobe method? Explain how handshake method solves the problem. [6+9]

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Code No: A109211202 **R09** **Set No. 3**

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Information Technology

Time: 3 hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give a brief note on register transfers.
   (b) What is microprogram sequencing? What are the design considerations for microprogram sequencer? [5+10]
2. (a) What is meant by memory? Briefly explain micro-computer memories.
   (b) Draw and explain set associative cache organization. [7+8]
3. (a) Explain the following addressing modes with examples:
      i. Register
      ii. Direct
      iii. Indirect
      iv. Index
      v. Immediate
   (b) Explain the format of an IA-32 instruction. [10+5]
4. (a) Find the complement of the functions F=A'BC'+A'B'C and G=A(B'C'+BC).
   (b) Draw a NAND logic diagram that implements the complement of the following function:
   F(A,B,C,D) = Σ (0,1,2,3,4,8,9,12). [5+10]
5. (a) What is the difference between a subroutine and an interrupt-service routine?
   (b) Explain how with the help of a DMA controller large blocks of data can be transferred at the high speed between an external device and main memory. [6+9]
6. (a) With a neat diagram explain the working of a 4-bit by 3-bit array multiplier.
   (b) Draw the flowchart for adding or subtracting two floating point binary numbers and explain. [8+7]
7. (a) Explain how a program gets executed faster using a cache memory.
   (b) What are self-complementing codes? Give example.
   (c) What is the radix of the numbers if the solution to the quadratic equation $x^2 - 10x + 31 = 0$ is x = 5 and x = 8? [6+4+5]
8. Show that a shift register with parallel load can be used to convert serial input to parallel output and parallel input to serial output. [15]

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