Printed Pages—4   CS—401

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1029   Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

B.Tech.

FOURTH SEMESTER EXAMINATION, 2004-2005

COMPUTER ORGANIZATION

Time : 3 Hours   *Total Marks : 100*

Note :   (i)   *Attempt ALL questions.*

(ii)   *All questions carry equal marks.*

1.   Attempt *any four* of the following :   (5x4=20)

(a)   Perform the following conversions.

(i) $(0.65625)_{10} \rightarrow (\ )_2$

(ii) $(736)_8 \rightarrow (\ )_2$

(iii) $(675.625)_{10} \rightarrow (\ )_{16}$

(iv) $(3A.2F)_{16} \rightarrow (\ )_{10}$

(v) $(A72E)_{16} \rightarrow (\ )_8$

(b)   Differentiate between ASCII and EBCDIC codes.

(c)   Using Karnaugh map, obtain simplified expression for the following Boolean function.

$F (A, B, C) = \Sigma\ (0, 2, 3, 4, 5, 6)$

(d)   Describe process of error detection and correction. Give an example of error detection code. Explain how it detects error.

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(e) State Booth Algo for multiplication of two numbers. Draw a logic diagram for the implementation of the Booth Algo for determining the product of two 8-bit signed numbers.

(f) Discuss the baised exponent floating point representation.

2. Attempt *any four* of the following : (5x4=20)

(a) Design and discuss a four-bit bidirectional shift register.

(b) Design a 4-bit Adder-Subtractor circuit.

(c) What is the purpose of counters ? How is ripple counter different to that of synchronous counters ? Draw a logic diagram of 3-bit synchronous counters.

(d) What is an ALU ? Draw logic diagram of ALU that perform AND, OR logic operations and ADD, SUB arithmetic operations.

(e) What is the need of having many addressing modes in machine ? Discuss Indirect and Displacement addressing in detail.

(f) How does control unit of a computer function ? Explain with the help of a block diagram.

3. Attempt *any four* of the following : (5x4=20)

(a) A block set Associative cache memory consist of 128 blocks divided into four block sets. The Main memory consists of 16384 blocks and each block contains 256 eight bit words.

(i) How many bits are required for addressing the Main memory ?

(ii) How many bits needed to represent the TAG, SET, WORD fields ?

(b) Write an assembly program to evaluate the arithmetic statement :

$$X = (A + B*C)/(D - E*F + G*H)$$

Using general register type computer with three address instruction.

(c) Name the various modes of data transfer and discuss Direct Memory Access mode in detail.

(d) Differentiate Direct mapping and Associative mapping procedures for organisation of cache memory with example. Give merits and demerits of both mapping procedures.

(e) What is the basic architecture of IOP ?

(f) How many 128 bytes RAM chips are required to provide a memory of 2048 bytes ? Show details of connection clearly indicating address, data and decoder configuration.

4. Attempt *any four* of the following :   (5x4=20)

(a) Explain the Flynn's Architectural Scheme.

(b) What is difference between RISC and CISC machine ?

(c) Describe Strobe control and Hand shaking for Asynchronous Data Transfer.

(d) What are the design parameters for pipeline processor ? Discuss them briefly with example.

(e) Describe vector processor and array processor. Also explain their similarities and differences.

(f) Write a program in Assembly Language for addition of two 3×3 matrices.

5. Write short notes on *any four* of the following :

(5x4=20)

    (a)   Delayed Branch and Branch Prediction mechanism.

    (b)   Parallel and Pipeline Processing.

    (c)   Hardwired and Microprogrammed control unit.

    (d)   Memory mapped Input/Output and I/O mapped Input/Output.

    (e)   Static RAM and Dynamic RAM.

    (f)   Indirect and Indexed Addressing mode.

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