

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

PAPER ID : 1029

Roll No.

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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 biased 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 : (5×4=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.