Printed Pages : 2 EEC402

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

PAPER ID : 0322 Roll No. | | | | | | | | | | |

B.Tech.

(SEMESTER. IV) THEORY EXAMINATION, 2012-13

COMPUTER ARCHITECTURE & ORGANIZATION

Time : 3 Hours] *[Total Marks : 100*

SECTION – A

10 × 2 = 20

1. Attempt **all** parts of this question :
   - (a) What is design methodology ?
   - (b) Name the different design levels of computer design.
   - (c) Draw the block diagram of processor-memory communication.
   - (d) What is Normalization and Biasing ?
   - (e) What is fixed point arithmetic ?
   - (f) Write down the general formulas for floating-point operations.
   - (g) What do you mean by Control Path of a design ?
   - (h) What do you mean by effective address of data ?
   - (i) What are Horizontal and Vertical micro-instructions ?
   - (j) What is Multiprogramming & Pipe Lining ?

SECTION – B

2. Attempt any **three** parts of this question : 3 × 10 = 30
   - (a) What is register level design ? Design a single function circuit performing Z: = A + B and a multifunction circuit for the same.
   - (b) Discuss Architectural Extensions in which basic design of small accumulator-based CPU can be improved. Draw the organization of processor with foregoing features.
   - (c) What are Combinational Array Multipliers ? Illustrate the Booth multiplication Algorithm.

(d) List the major steps of the classical design method for control path. Design a All-NAND classical design for the control unit of the gcd processor.

(e) Explain control unit organization. Differentiate between spatial and temporal locality of reference. Aid your answer with suitable examples.

SECTION – C

Attempt **all** questions & Attempt any **two** parts from each question : **5 × 10 = 50**

3. (a) Explain Internal organization of a CPU and Cache Memory.

(b) Discuss about advantages and disadvantages of PLD's.

(c) Design a 4-bit register with parallel I/O and 4-bit register with parallel load.

4. (a) What is the need of addressing mode ? A two word instruction is stored in memory at an address designated by symbol W. The address field of the instruction (stored at W + 1) is designated by symbol Y. The operand used during the execution of instruction is stored at an address symbolized by Z.

An index register contains the value X. Show how Z is calculated from other address if the addressing mode of the instruction is (i) direct (ii) indirect.

(b) Discuss about Exceptional conditions in arithmetic operations involving n-bit numbers.

(c) Explain with block diagram Error Detection and Correction Logic.

5. (a) What are high speed adders ? Design a Carry Lookahead adder.

(b) Design a data path unit with an ALU and a register file.

(c) Draw and explain data path of a floating-point arithmetic unit.

6. (a) Draw a structure of an 8M x 8 bit DRAM chip. Explain its specifications.

(b) Draw a structure of a translation look-aside buffer and explain its working.

(c) Explain the organization of a four stage instruction pipelining.

7. (a) Draw and explain typical micro programmed controller.

(b) What is program control unit ? Design a state transition graph for the accumulator – based CPU.

(c) Describe through diagram how matched word can be read out from an associative memory.