Printed Pages – 4 TCS – 401

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

PAPER ID : 1067 Roll No. | | | | | | | | | | |

B.Tech.

(SEM IV) EVEN SEMESTER THEORY EXAMINATION, 2009-2010

COMPUTER ORGANIZATION

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt **ALL** questions.*

*(ii) All questions carry **equal** marks.*

(iii) Be precise in your answer.

*(iv) **No Second Answer** book will be provided.*

1. Attempt **any four** parts of the following : **(4x5=20)**

(a) The following transfer statements specify a memory. Explain the memory operation in each case :

(i) R2 ← M[AR]

(ii) M[AR] ← R3

(iii) R5 ← M[R5]

(b) Design a 4-bit combinational circuit decrementer using four full-adder circuits.

(c) Design a bus system for four registers, and also give the block diagram for the same.

(d) Give the hardware implementation of the following operations :

(i) selective-set

(ii) selective complement

(e) What do you mean by bus arbitration ? Explain with suitable diagram.

(f) Write short note on Booth's multiplication algorithm.

2. Attempt **any two** parts of the following : **(2x10=20)**

(a) What do you understand by micro-programmed control ? Describe the micro-programmed control organization in detail with block diagram.

(b) Write short note on the following :

(i) Microinstruction with next address field,

(ii) hardwired control unit.

(c) (i) What do you mean by multiple-bus organization ? Explain with block diagram.

(ii) Formulate a mapping procedure that provides eight consecutive microinstructions for each routine. The operation code has six bits and the control memory has 2048 words.

3. Attempt **any two** parts of the following : **(2x10=20)**

(a) A relative mode branch type of instruction is stored in memory at an address equivalent to decimal 750. The branch is made to an address equivalent to decimal 500.

(i) What should be the value of the relative address field of the instruction (in decimal) ?

(ii) Determine the relative address value in binary using 12 bits. Why must the number be in 2's complement ?

(iii) Determine the binary value in PC after the fetch phase and calculate the binary value of 500.

(b) Define the following with example.

(i) Control word.

(ii) Three address instructions.

(iii) Zero addresses instructions.

(iv) Auto increment or Auto decrement addressing mode.

(v) Overflow and underflow conditions.

(c) (i) Write short note on Reduced Instruction Set Computer (RISC).

(ii) List five typical program control instructions. Also explain these with example.

4. Attempt **any two** parts of the following : **(2x10=20)**

(a) (i) Define interrupt. Also discuss various types of interrupts with suitable examples.

(ii) Describe the functions of I/O interface. Also explain isolated I/O and memory-mapped I/O with suitable examples.

(b) Write short note on the following together with their importance :

(i) DMA processor,

(ii) Handshaking protocol for data transfer.

(c) Write short note :

(i) Serial communication

(ii) Input/Output processor

Attempt **any two** parts of the following : **(2x10=20)**

(a) Define memory map. An 8-bit computer has a 16-bit address bus. The first 15 lines of the address are used to select a bank of 32K bytes of memory. The high order bit of the address is used to select a register which receives the contents of the data bus. Explain how this configuration can be used to extend the memory capacity of the system to 8 banks of 32K bytes each, for a total of 256K bytes of memory ?

(b) (i) Define cache memory. Also explain two-way set-associative mapping cache organization with suitable block diagram.

(ii) Describe the various basic components of memory management hardware together with their functions.

(c) Write short note on ***any two*** of the following :

(i) Memory protection

(ii) Magnetic Disk

(iii) Logical data layout on a CD-ROM

(iv) RAID

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