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

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

B.Tech.

FOURTH SEMESTER EXAMINATION, 2005-2006

COMPUTER ORGANIZATION

Time : 3 Hours *Total Marks : 100*

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

(ii) All questions carry equal marks.

(iii) In case of numerical problems assume data wherever not provided.

(iv) Be precise in your answer.

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

(a) Design the carry look ahead adder.

(b) Draw a diagram of a bus system for four registers that uses three state buffer and a decoder instead of the multiplexers.

(c) Give a brief description of the various I/O bus architecture.

(d) Represent the following conditional control statement by two register transfer statements with control functions.

If (P = 1) then (R1 ← R2) else
if (Q = 1) then (R1 ← R3)

(e) Show the multiplication process using Booth's algorithm when the following binary numbers are multiplied.

(-12) * (-18)

(f) Explain the floating point representation for binary numbers. When is a floating point number said to be normalized ?

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

(a) Write the sequence of control step required for the structure of single bus organization for each of the following :

(i) Add the number num to register rl.

(ii) Add the content of memory location num to register rl.

(b) Explain the hardwired control unit organization explaining each component clearly.

(c) Write the difference between hardwired and micro programmed control unit.

(d) Explain the working of micro-program sequencer with block diagram.

(e) Define the following :

(i) Microoperation

(ii) Microinstruction

(iii) Microprogram

(iv) Microcode

(f) What are the various phases for executing an instruction ?

3. Attempt *any two* parts of the following : (10x2=20)

(a) Write a program to evaluate the arithmetic statement

$$X=A * B+A * (B * D + C * F)$$

Use two, three, zero and one address machine.

(b) Write short notes on the following with examples :

(i) Direct addressing

(ii) Indirect addressing

(iii) Immediate addressing

(iv) Register Indirect addressing

(c) What is difference between RISC and CISC machine ? Write the RISC I instructions in assembly language that will cause a jump to address 3200 if Z (Zero) status bit is equal to I using immediate mode.

4. Attempt *any two* parts of the following : (10x2=20)

(a) What is basic advantage of using interrupt initiated data transfer over transfer under program control without an interrupt ?

(b) How CPU and DMA controller work when they share single set of buses ? Explain it with the help of Cycle Stealing Diagram.

(c) Discuss why interfacing is used in digital computers. Explain salient features of a device interface.

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5. Attempt *any two* parts of the following : **(10x2=20)**

(a) Discuss the various organization of RAM. A computer uses RAM chips of 1024x1 capacity. How many chips are needed and how should their address lines be connected to provide a memory capacity of 1024 bytes ?

(b) Explain various cache mapping techniques. A computer system has a 4k word cache organised in block set associative manner with 4 blocks per set, 64 words per block. The main memory contains 65536 blocks. How many bits are there in each of the TAG, SET & WORD fields ?

(c) Describe memory hierarchy.

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