

(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 1 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.

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.