



SF-7083

B. E. - III (Sem. VI) (EC) Examination
May / June - 2011
Computer Architecture & Organization

Time : 3 Hours]

[Total Marks : 100

Instruction :

नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवही पर अवश्य कभवी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. E. - 3 (SEM. 6) (EC)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="COMPUTER ARCHITECTURE & ORGANIZATION"/>	<input type="text"/>
Subject Code No. : <input type="text" value="7"/> <input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="3"/>	<input type="text" value="Student's Signature"/>
Section No. (1, 2,.....) : <input type="text" value="NIL"/>	

- 1 (a) Answer the following : 10
- (i) Define : Instruction code.
 - (ii) What is the functionality of CAR ?
 - (iii) In _____ mode, the operands are specified implicitly in the definition of the instruction.
(a) Immediate (b) Implied (c) Relative
 - (iv) What is the full form of BTB ?
 - (v) Write the microoperation for ADD instruction.
 - (vi) "Microprogramming is used for designing of control unit". State true or false.
 - (vii) "External interrupts arise from illegal or erroneous use of an instruction or data." State true or false.
 - (viii) _____ organization is only of theoretical interest since no practical system has been constructed using this organization.
(a) SIMD (b) SISD (c) MIMD (d) MISD
 - (ix) _____ instruction is not a register reference instruction.
(a) SPA (b) STA (c) SZA
 - (x) What are the two instructions needed in the basic computer in order to set E flip-flop to 1 ?

- (b) (i) Write down major characteristics of RISC processor. 6
- (ii) An output program resides in memory starting from the address 2300. 4
 It is executed after the computer recognizes an interrupt when FGO becomes a 1. (while IEN = 1).
 (a) What instruction must be placed at address 1 ?
 (b) What must be last two instructions of the output program ?
- 2 (a) Convert the following arithmetic expression from reverse polish notation into infix notation. 8
 (i) ABCDE+ * - /
 (ii) ABCDE* / - +
 (iii) ABC* /D - EF /+
 (iv) ABCDEFG +*+*+*
- (b) Explain instruction cycle in detail with flow chart. 7
- OR**
- 2 (a) The following register transfers are to be executed in common bus system. For each transfer, specify : (1) The binary value that must be applied to bus select inputs S21, S1, S0. (2). The register whose LD control input must be active (if any), (3) A memory read or write operation (if needed), (4) The operation in the adder and logic circuit (if any). 8
 (i) $AR \leftarrow PC$
 (ii) $IR \leftarrow M [AR]$
 (iii) $M [AR] \leftarrow TR$
 (iv) $AC \leftarrow DR, DR \leftarrow AC$ (done simultaneously)
- (b) (i) Explain the difference between hardwired control and microprogrammed control. Is it possible to have a hardwired control associated with a control memory ? 3
- (ii) Define the following terms : 4
 (a) microoperation
 (b) microinstruction
 (c) microprogram
 (d) microcode

- 3** Attempt any three : **15**
- (i) Explain four segment instruction pipeline.
 - (ii) A two-word instruction is stored in memory at an address designated by the symbol W. The address field of the instruction (stored at W+1) is designated by the symbol Y. The operand used during execution of the instruction is stored at an address symbolized by Z. An index register contains the value X. State how Z is calculated from the other addresses if the addressing mode of the instruction is : (a) direct (b) indirect (c) relative (d) indexed.
 - (iii) Derive the speedup ratio of pipeline processing over an equivalent nonpipeline processing.
 - (iv) Explain selection of address for control memory.
 - (v) Explain memory interleaving.
- 4** (a) Answer the following : **10**
- (i) What is cycle-stealing ?
 - (ii) Booth algorithm gives a procedure for multiplying binary integers in signed-2's complement representation. State true or false.
 - (iii) _____ is a program whose function is to start the computer software operating when power is turned on.
 - (iv) Define : address space.
 - (v) What is Baud-rate ?
 - (vi) In a non-vectored interrupt, the source that interrupts supplies the branch information to the computer. State true or false.
 - (vii) The devices that provide backup storage are called _____.
 - (a) auxiliary memory
 - (b) main memory
 - (c) associative memory
 - (d) cache memory
 - (viii) In which floating point operations alignment of mantissas is not required ?
 - (ix) What do you mean by critical section ?
 - (x) Why does DMA have priority over the CPU when both request a memory transfer ?
- (b) Explain addition and subtraction for signed magnitude 10 data with flow-chart.

- 5 (a) What do you mean by asynchronous transfer ? 8
Explain handshaking and strobe control method.

OR

- (a) The access time of a cache memory is 100 ns and 8
that of main memory is 1000 ns. It is estimated that
80 percent of the memory requests are for read and the
remaining 20 percent for write. The hit ratio for read
accesses only is 0.9. A write-through procedure is used.
(i) What is the average access time of the system
considering only memory read cycles.
(ii) What is the average access time of the system for
both read and write requests ?
(iii) What is the hit ratio taken into consideration on
the write cycles ?
- (b) Discuss the difference between tightly coupled 6
multiprocessors and loosely coupled multiprocessors.

OR

- (b) An address space is specified by 24 bits and the 6
corresponding memory space by 16 bits.
(i) How many words are there in the address space ?
(ii) How many words are there in the memory space ?
(iii) If a page consists of 2K words, how many pages and
blocks are there in the system ?

- 6 Attempt any four : 16
- (i) Indicate weather the following constitute a control,
status or data transfer commands.
(a) Skip next instruction if flag is set.
(b) Seek a given record on magnetic disk.
(c) Check if I/O device is ready.
(d) Move printer pager to beginning of next page.
- (ii) Mutual exclusion with semaphore.
(iii) Array multiplier.
(iv) FIFO-buffer
(v) Page replacement techniques
(vi) Describe in words and by means of block diagram how
multiple matched words can be read out from an
associative memory.