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**Fourth Semester B.E. Degree Examination, December 2010**  
**Computer Organization**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting  
at least TWO questions from each part.**

**PART - A**

1. a. What is a stored program concept? Explain the functional units of a stored program digital computer, along with a block diagram. (10 Marks)
- b. Define the following terms: (10 Marks)
  - i) Processor clock
  - ii) RISC
  - iii) SPEC rating
  - iv) Basic performance equation
  - v) the stack frame
2. a. Represent the decimal values 5, -2 and -10 in the following binary formats: (06 Marks)
  - i) Sing and magnitude
  - ii) 1's complement
  - iii) 2's complement
- b. Registers  $R_1$  and  $R_2$  of a computer, contain the decimal values 1200 and 4600. What is EA of the memory operand in each of the following instructions? (05 Marks)
  - i) Load 20( $R_1$ ),  $R_5$
  - ii) MOVE #3000,  $R_5$
  - iii) Store  $R_5$ , 30( $R_1$ ,  $R_2$ )
  - iv) Add  $-(R_2)$ ,  $R_5$
  - v) Subtract ( $R_1$ )+,  $R_5$
- c. Consider the following possibilities for saving the return address of a subroutine:
  - i) In a processor register
  - ii) In a memory location
  - iii) On a stack

Which of these possibilities support the subroutine nesting and which support subroutine recursion? (09 Marks)
3. a. What is an interrupt? Explain polling and vectored interrupts with their advantages and disadvantages. (08 Marks)
- b. What is DMA? What are its advantages? With the supporting diagram, explain different registers in a DMA interface. (06 Marks)
- c. What is bus arbitration? Explain the centralized arbitration, with a neat diagram. (06 Marks)
4. a. What is a synchronous bus? Explain the timing of an input transfer on a synchronous bus with a timing diagram. (06 Marks)
- b. Define: (08 Marks)
  - i) Cycle stealing
  - ii) burst mode
  - iii) Full handshake
  - iv) Plug-and-play
- c. What are the interface circuits? Explain a general 8-bit parallel interface, with a neat diagram. (06 Marks)

**PART – B**

- 5 a. Explain the synchronous DRAM, with a neat diagram. (10 Marks)  
b. What is a cache? Explain any two cache mapping functions. (10 Marks)
- 6 a. What are the replacement algorithms? Briefly explain the LRU replacement algorithm. (08 Marks)  
b. What is a virtual memory? With a neat block diagram, explain the virtual memory address translation. (08 Marks)  
c. Briefly explain the controller's major functions on the disk drive side. (04 Marks)
- 7 a. With a neat diagram, explain the floating point addition/subtraction unit. (10 Marks)  
b. With a neat block diagram, explain the 4-bit carry-lookahead adder. (10 Marks)
- 8 a. Explain the 3-bus organization of the data path with a neat diagram and write the control sequence for the instruction ADD R4, R5, R6 for the 3-bus organization. (10 Marks)  
b. With a neat block diagram, explain the hardwired control unit. (10 Marks)

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