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10CS46

Fourth Semester B.E. Degree Examination, June 2012
Computer Organization

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1
 - a. What is performance measurement? Explain the overall SPEC rating for the computer in a program suite. (04 Marks)
 - b. List and explain the technological features and devices improvement made during different generations of computers. (08 Marks)
 - c. Mention four types of operations to be performed by instructions in a computer. Explain with basic types of instruction formats to carry out $C \leftarrow [A] + [B]$. (08 Marks)

- 2
 - a. Define an addressing mode. Explain the following addressing modes, with example : immediate, indirect, index, relative and auto increment. (10 Marks)
 - b. What is a stack frame? Explain a commonly used layout for information in a subroutine stack frame.
 - c. Explain shift and rotate operations, with example. (10 Marks)

- 3
 - a. In a situation where multiple devices capable of initiating interrupts are connected to processor, explain the implementation of interrupt priority, using individual \overline{INTER} and \overline{INTA} and a common \overline{INTR} line to all devices. (10 Marks)
 - b. Define the terms 'cycle stealing' and 'block mode'. (02 Marks)
 - c. What is bus arbitration? Explain the different approaches to bus arbitration. (08 Marks)

- 4
 - a. Explain with a neat block diagram, the hardware components needed for connecting a keyboard to a processor. (08 Marks)
 - b. Briefly discuss the main phases involved in the operation of SCSI bus. (06 Marks)
 - c. Explain the tree structure of USB with split bus operation. (06 Marks)

PART – B

- 5
 - a. Explain the internal organization of a 16 megabit DRAM chip, configured as $2\text{ M} \times 8$ cells. (08 Marks)
 - b. With a block diagram, explain the direct and set associative mapping between cache and main memory. (06 Marks)
 - c. Describe the principles of magnetic disk. (06 Marks)

- 6
 - a. Explain with figure the design and working of a 16-bit carry – look – ahead adder built form 4-bit adders. (06 Marks)
 - b. Explain Booth algorithm. Apply Booth algorithm to multiply the signed numbers +13 and – 6. (10 Marks)
 - c. Differentiate between restoring and non-restoring division. (04 Marks)

- 7 a. List out the actions needed to execute the instruction $\text{add}(R_3), R_1$. Write and explain sequence of control steps for the execution of the same. **(10 Marks)**
- b. With a neat block diagram, explain hardwired control unit. Show the generation Z_{in} and End control signals. **(10 Marks)**
- 8 a. State Amdahl's law. Suppose a program runs in 100 sec on a computer with multiply operation responsible for 80 sec of this time, how much it requires to improve the speed of multiplication, if the program has to run 5 times faster? Justify your answer **(06 Marks)**
- b. Explain the classic organization of a shared – memory multiprocessor. **(06 Marks)**
- c. What is hardware multithreading. Explain the different approaches to hardware multithreading. **(08 Marks)**

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