Pre-Semester Exam (2070)

Set A

Full marks: 80

Pass marks: 32

Time: 3 hours.

Bachelor Level/Second Year/Third Semester/Science

**Computer Science and Information Technology (CSc. 201)**

(Computer Architecture)

*Candidates are required to give their answers in their own words as far as practicable.* The figures in the margin indicate full marks.

**Long Questions:**

Attempt any two questions: (2\*10=20)

1. Explain address mapping using pages. A virtual memory system has an address space of 8K words, a memory space of 4K words, and page and block sizes of IK words. The following page reference changes occur during a given time interval. (Only page changes are listed. If the same page is referenced again, it is not listed twice.)

4 2 0 1 2 6 1 4 0 1 0 2 3 5 7

Determine the four pages that are resident in main memory after each page reference change if the replacement algorithm used is (a) FIFO; (b) LRU.

1. Explain the restoring division algorithm with suitable example.
2. What is a microprogram sequencer? With block diagram, explain the working of microprogram sequencer.

**Short Questions:**

Attempt any ten questions: (10\*6=60)

1. Differentiate between address space and memory space. An address space is specified by 24 bits and the corresponding memory space by 16 bits. If a page consists of 2K words, how many pages and blocks are there in the system?
2. What do you mean by memory hierarchy in a computer system?
3. What is cycle stealing DMA operation? Why read and write control lines in a DMA controller bidirectional? Under what condition and for what purpose are they used as inputs?
4. What do you mean by interrupt? Draw and explain the flowchart for interrupt cycle.
5. What the difference is between isolated and memory mapped I/O? What are the different types of I/O commands?
6. Perform the operation -18 x 12 by using booth multiplication algorithm.
7. Explain any five types of addressing modes with example.
8. Explain the logic micro-operation in brief.
9. Explain Overlapped Register Windows with suitable example.
10. Write short notes on (any two)
    1. Normalization of floating point number
    2. Subroutines
    3. overflow detection with both signed and unsigned numbers.
11. Write down the following equation in three address, two address and one address instruction.
    1. Y= (A\*B)+E(C/D)

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Set B

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**Computer Science and Information Technology (CSc. 201)**

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**Long Questions:**

Attempt any two questions: (2\*10=20)

1. Why memory management system is necessary? Differentiate between virtual and cache memory. A virtual memory system has 6k words of address space and 3k words of memory space. Page references are made by CPU in following sequence:

3, 2, 0, 3, 4, 1, 2, 2, 0

Find out the pages that are available at the end if the replacement algorithm used is (a) LRU (b) FIFO Assume the page and block size of 1k words.

1. Why do computers need input-output interface? Explain the sequence of operations carried out during CPU-IOP communication with the help of suitable flowchart.
2. With neat diagram, explain the non-restoring division algorithm with suitable example.

**Short Questions:**

Attempt any ten questions: (10\*6=60)

1. Write notes on RAM and ROM chips.
2. Write a program to evaluate the arithmetic statement.

P =

(X-Y+Z)\*(M\*n-o)

Q+R\*S

By using

(i) Two address instructions (ii) Zero address instructions

1. Perform the operation -14 x 17 by using signed magnitude representation.
2. What are the major difference between RISC and CISC architecture?
3. Explain data transfer instructions with example.
4. Give the comparison between hardwired control unit and micro programmed control unit.
5. Explain the input output configuration of a basic computer.
6. Explain the shift micro-operation in brief.
7. Write short notes on (any two)
   1. Floating point representation
   2. Division Overflow
   3. Address mapping
8. Explain General Register Organisation in detail with suitable diagram of Register set with common ALU and example of microoperation.
9. Explain Common Bus System?