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MCA (Dual Degree)
(SEM-II) THEORY EXAMINATION 2018-19
COMPUTER ORGANIZATION

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Discuss the term computer organization.
b. What are the various operations performed on data storcd in the registers?
c. What is wrong with the following register transfer statements?
   i. xT : AR←AR', AR←0
   ii. yT : R1←R2, R1←R3
d. Discuss micro program sequencing.
e. What are the various types of flags are used in storage component of CPU?
f. Discuss the role of scratch pad memory in designing data path for CPU.
g. What do you mean by instruction format?
h. Discuss internal and external interrupts.
i. What do you mean by synchronous and asynchronous operations?
j. What do you mean by hit ratio? How it is calculated?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Explain the working of 4-bit adder/subtractor and 4-bit incrementer /decrementer arithmetic circuits with examples.
b. Design 4-bit arithmetic logic shift unit and list out various operations performed by it.
c. Discuss the various operations performed by control unit with examples.
d. Two computers use register windows with the following characteristics. Determine the window size and total number of registers in each computer.

	Computer 1	Computer 2
Global registers	10	8
Local registers	10	8
Common registers	6	8
Number of windows	8	8

e. What do you mean by memory hierarchy? Discuss various types of measurements involved for it.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) The following transfer statements specify a memory. Explain the memory operation in each case.
   a. R2←M[AR]
   b. M[AR]←R3
   c. R5←M[R5}

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(b) Explain the following logic micro operations with examples.
   i. Selective-Set
   ii. Masking
   iii. Clear

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Discuss rotate, rotate through carry and arithmetic shift micro operations by taking examples.

(b) How the words can be fetched and stored? Discuss.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) A bus-organized CPU has 8 registers with 16 bits in each, an ALU, and a destination decoder.
   i. How many multiplexer arc there in A bus what is the size of multiplexers?
   ii. How many selection lines are needed for multiplexers and decoder?
   iii. Formulate a control word for the system assuming that ALU has 35 operations.

(b) Discuss various displacement type addressing modes with examples.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define interrupt handlers. Discuss various steps in handling interrupts.

(b) Discuss the addition and subtraction algorithm for signed numbers by taking some examples.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Design and describe the connection of memory to CPU for constructing 512 bytes RAM and 512 bytes ROM. Use RAM chips of 128 bytes and ROM chips of 512 bytes.

(b) What do you mean by pagc faults? Find out page fault for the reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for frame size three using optimal page replacement algorithm.

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