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MCA
(SEM I) THEORY EXAMINATION 2022-23
COMPUTER ORGANIZATION & ARCHITECTURE

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

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

SECTION A

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

(a) List out various functional units of a digital computer.
(b) Define bus and memory transfer.
(c) What do you mean by carry generation and carry propagation?
(d) Represent -14 using 2's complement method.
(e) What are the various types of instructions?
(f) Define logic micro-operation.
(g) What do you mean by 2D memory organization?
(h) What is page replacement?
(i) Define the term interrupt.
(j) What do you mean by serial communication?

SECTION B

2. Attempt any *three* of the following: **3x10=30**

(a) Discuss any five addressing modes with example.
(b) Multiply -8 and -14 using signed operand multiplication method.
(c) Write short note on Reduced Instruction Set Computers (RISC).
(d) Discuss FIFO and LRU page replacement policies for the reference string 3, 4, 0, 1, 4, 3, 2, 0, 1, 2, 0, 4 and find out page faults in each case.
(e) Discuss interrupt handling process with the help of flow chart.

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

(a) Design four bit arithmetic unit and discuss various operation performed by it.
(b) How the operation performed by stack? Evaluate X:=5 + 6(8 – 2 * 3) using stack.

4. Attempt any *one* part of the following: **10x1=10**

(a) Discuss register organization if a computer system has seven registers R1 to R7. How the operation R1← R2 + R3 can be performed? Discuss.
(b) Design the circuit for 4 by 3 array multiplier.

5. Attempt any *one* part of the following: 10x1=10

(a) What are various types of computer instructions? Discuss register reference, memory reference and I/O instructions.

(b) What do you mean by pipelining? Discuss arithmetic pipeline.

6. Attempt any *one* part of the following: 10x1=10

(a) What do you mean by memory hierarchy? Discuss memory hierarchy in detail.

(b) Discuss address mapping of RAM and ROM by taken an example.

7. Attempt any *one* part of the following: 10x1=10

(a) Write short note on IBM 370 I/O channel.

(b) Discuss any two data transfer mode for peripheral devices.