

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 $R1 \leftarrow R2 + R3$ 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.

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