PAPER ID-310204

Roll No:

BCA
(SEM III) THEORY EXAMINATION 2025-26
COMPUTER ORGANIZATION

TIME: 3 HRS   **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 07 = 14**

Q no.	Question	CO
a.	Describe the working of a common bus system in a processor.	1
b.	Explain the limitations of ripple carry adders.	1
c.	Explain the fundamental concepts of control unit operation.	2
d.	Explain multiple bus organization in a CPU.	2
e.	How do register files improve instruction execution efficiency compared to accumulator based designs.	3
f.	Describe the functions performed by an I/O interface between CPU and peripheral devices.	4
g.	Explain memory hierarchy with suitable examples	5

SECTION B

2. **Attempt any *three* of the following:**   **7 x 3 = 21**

a.	Explain Register Transfer Language as a tool for describing microoperations. How does RTL help in bridging hardware design and algorithmic thinking.	1
b.	Describe the complete execution cycle of an instruction. Explain fetch, decode, execute, and write-back phases using control signals and timing steps.	2
c.	Describe stack organization in processors. Explain stack based instruction execution and compare it with general register organization.	3
d.	Describe interrupt handling in detail. Explain interrupt priority, masking, and the sequence of events during interrupt servicing.	4
e.	Explain cache memory organization. Discuss mapping techniques, replacement policies, and write strategies in detail.	5

SECTION C

3. **Attempt any *one* part of the following:**   **07 x 1 = 07**

a.	Explain Booth's multiplication algorithm in detail. Why is it preferred over simple multiplication methods for signed numbers. Discuss its advantages and limitations.	1
b.	Explain the design and functioning of an Arithmetic Logic Shift Unit. How are arithmetic, logical, and shift microoperations integrated within a single hardware unit.	1

4. **Attempt any *one* part of the following:**   **07 x 1 = 07**

a.	Explain microinstruction sequencing in a microprogrammed control unit. Discuss wide branch addressing, next-address field, and the role of microinstruction prefetching.	2
b.	Compare hardwired control and microprogrammed control units. Explain their design approaches, speed differences, flexibility, and real-world applications.	2

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5.   **Attempt any *one* part of the following:**   **07 x 1 = 07**

| a. | Explain various addressing modes used in processors. How do addressing modes influence instruction flexibility, program size, and execution speed. | 3 |
| b. | Explain the concept of Reduced Instruction Set Computer. Discuss its design philosophy, advantages over CISC, and impact on compiler design. | 3 |

6.   **Attempt any *one* part of the following:**   **07 x 1 = 07**

| a. | Explain the concept of an Input Output Processor. How does it differ from DMA. Discuss its role in large scale computer systems. | 4 |
| b. | Explain Direct Memory Access. How does DMA improve system performance. Discuss DMA controller operation and bus arbitration. | 4 |

7.   **Attempt any *one* part of the following:**   **07 x 1 = 07**

| a. | Explain memory management hardware in modern processors. Discuss the role of MMU, TLB, and protection mechanisms. | 5 |
| b. | Explain virtual memory concept. Describe paging mechanism, page tables, and address translation hardware. | 5 |