



# PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--

## End - Term Examinations – MAY 2025

Date: 23-05-2025

Time: 01:00 pm –04:00 pm

<b>School:</b> SOCSE	<b>Program:</b> B. Tech-CSE	
<b>Course Code:</b> CSE2009	<b>Course Name:</b> Computer Organization and Architecture	
<b>Semester:</b> IV	<b>Max Marks:</b> 100	<b>Weightage:</b> 50%

CO - Levels	C01	C02	C03	C04	C05
Marks	26	26	24	24	-

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	List the functional units of computer system.	2 Marks	L1	C01
2.	Distinguish between CISC and RISC Processor.	2 Marks	L2	C01
3.	Summarize the type of ROM used in computer system.	2 Marks	L2	C02
4.	Outline the processor execution time equation of a computer system.	2 Marks	L1	C01
5.	Distinguish between PUSH and POP instruction with examples.	2 Marks	L2	C02
6.	Distinguish between MAR and MDR in Computer Architecture.	2 Marks	L2	C02
7.	Compute the recoded form of the sequence $(10110111)_2$ using the Booth's Algorithm Recoding Table.	2 Marks	L2	C03
8.	Outline the flowchart of Programmed I/O Communication Technique.	2 Marks	L1	C03
9.	Outline the control sequence for the instruction ADD R1, R2, R3 in Single Bus architecture.	2 Marks	L1	C04
10.	List the tasks involved in pipelining concepts of computer system.	2 Marks	L1	C04

## Part B

### Answer the Questions.

**Total Marks 80M**

<b>11.</b>	<b>a.</b>	Distinguish between the big endian assignment and little endian assignment with suitable example.	<b>4 Marks</b>	<b>L2</b>	<b>C01</b>
	<b>b.</b>	Explain the types of instructions based on addresses with suitable examples.	<b>6 Marks</b>	<b>L2</b>	<b>C01</b>
	<b>c.</b>	Compute the overflow values for the 5-bit signed number addition of the following i. $(-12) + (-10)$ ii. $(-9) - (-13)$ iii. $(-11) + (-8)$ iv. $(-9) - (-8)$ v. $(+14) + (-7)$	<b>10 Marks</b>	<b>L2</b>	<b>C01</b>

**Or**

<b>12.</b>	<b>a.</b>	Explain the communication between the Processor and Memory with block diagram.	<b>4 Marks</b>	<b>L2</b>	<b>C01</b>
	<b>b.</b>	Describe the purpose of bus structure in Computer System with necessary blocks.	<b>6 Marks</b>	<b>L2</b>	<b>C01</b>
	<b>c.</b>	Summarize the architecture of Single Bus architecture and Multiple Bus architecture with block diagram.	<b>10 Marks</b>	<b>L2</b>	<b>C04</b>

<b>13.</b>	<b>a.</b>	Explain Memory Hierarchy in computers with a neat diagram.	<b>4 Marks</b>	<b>L2</b>	<b>C02</b>
	<b>b.</b>	Compute the Effective address of the following instruction i. $\text{ADD (R3)+, R4}$ ii. $\text{STORE 100(R3,R2),(R4)}$ iii. $\text{MOV \#4004, R2}$ iv. $\text{LOAD 14(R2),R7}$ v. $\text{SUB -(R1),R2}$ vi. $\text{STORE 50(R4),R1}$	<b>6 Marks</b>	<b>L2</b>	<b>C02</b>
	<b>c.</b>	Consider a cache consisting of 256 blocks of 16 words each, for a total of 4096 words and assume main memory is addressable by 16 bit address and it consists of 4K blocks. Calculate the mapping formats for the different mapping techniques.	<b>10 Marks</b>	<b>L3</b>	<b>C02</b>

**Or**

<b>14.</b>	<b>a.</b>	Explain about Cache memory and its usage in Computer organization.	<b>4 Marks</b>	<b>L2</b>	<b>C02</b>
	<b>b.</b>	Describe the memory read/write operation of the 16 X 8 Internal Memory chip.	<b>6 Marks</b>	<b>L2</b>	<b>C02</b>
	<b>c.</b>	Illustrate the various addressing modes of computer instructions with examples.	<b>10 Marks</b>	<b>L3</b>	<b>C02</b>

<b>15.</b>	<b>a.</b>	Covert the following values to Single Precision Floating Point. i) $-0.011561$ ii) $+0.000789$	<b>4 Marks</b>	<b>L2</b>	<b>C03</b>
	<b>b.</b>	Make use of Sign Extension algorithm to solve the multiplication of $(+31)$ and $(-28)$ .	<b>6 Marks</b>	<b>L3</b>	<b>C03</b>

	<b>c.</b>	Demonstrate the 4 bit adder circuit to reduce the latency in the propagation of the Carry signal with necessary diagrams.	<b>10 Marks</b>	<b>L3</b>	<b>C03</b>
<b>Or</b>					
<b>16.</b>	<b>a.</b>	Convert the following values to Single Precision Floating Point i) -0.001786 ii) +0.23546	<b>4 Marks</b>	<b>L2</b>	<b>C03</b>
	<b>b.</b>	Make use of Booth's algorithm to solve the multiplication of (+22) and (-19)	<b>6 Marks</b>	<b>L3</b>	<b>C03</b>
	<b>c.</b>	Utilize the Restoration Method to solve the division of 15 by 9.	<b>10 Marks</b>	<b>L3</b>	<b>C03</b>

<b>17.</b>	<b>a.</b>	Distinguish between Memory mapped IO and I/O mapped I/O.	<b>4 Marks</b>	<b>L2</b>	<b>C04</b>
	<b>b.</b>	Describe the importance of Direct Memory Access controller with architecture	<b>6 Marks</b>	<b>L2</b>	<b>C04</b>
	<b>c.</b>	Identify the control sequence for the instruction of ADD (R2), R1 for the Single Bus Architecture with diagram.	<b>10 Marks</b>	<b>L1</b>	<b>C04</b>
<b>Or</b>					
<b>18.</b>	<b>a.</b>	Explain about the Interrupt based I/O Communication	<b>4 Marks</b>	<b>L2</b>	<b>C04</b>
	<b>b.</b>	Identify the control sequence for the instruction of ADD R3,R4,R5 for the Multiple Bus Architecture with diagram	<b>6 Marks</b>	<b>L1</b>	<b>C04</b>
	<b>c.</b>	Describe the types of hazards in pipelining with necessary diagram.	<b>10 Marks</b>	<b>L2</b>	<b>C04</b>