



# Faculty of Engineering

## End Semester Examination May 2025

### EE3CO63 Computer System Architecture

<b>Programme</b>	<b>:</b>	<b>B.Tech.</b>	<b>Branch/Specialisation</b>	<b>:</b>	<b>EE</b>
<b>Duration</b>	<b>:</b>	<b>3 hours</b>	<b>Maximum Marks</b>	<b>:</b>	<b>60</b>

**Note:** All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Section 1 (Answer all question(s))					Marks	CO	BL
<b>Q1.</b>	During the execution of a program which gets initialized first?				1	1	1
	<input type="radio"/> MDR	<input type="radio"/> IR					
	<input checked="" type="radio"/> PC	<input type="radio"/> MAR					
<b>Q2.</b>	Which component in the Von-Neumann architecture is responsible for storing both data and instructions?				1	2	2
	<input type="radio"/> Control Unit	<input type="radio"/> Arithmetic Logic Unit (ALU)					
	<input checked="" type="radio"/> Memory Unit	<input type="radio"/> Input/Output System					
<b>Q3.</b>	In a stack-based organization, the operation that removes the top element from the stack is called-				1	1	1
	<input type="radio"/> Push	<input checked="" type="radio"/> Pop					
	<input type="radio"/> Load	<input type="radio"/> Fetch					
<b>Q4.</b>	In memory hierarchy, which type of memory is closest to the CPU and offers the fastest access times?				1	3	2
	<input checked="" type="radio"/> Cache memory	<input type="radio"/> RAM					
	<input type="radio"/> Hard disk	<input type="radio"/> Secondary storage					
<b>Q5.</b>	Whenever the data is found in the cache memory it is called _____.				1	1	1
	<input checked="" type="radio"/> HIT	<input type="radio"/> MISS					
	<input type="radio"/> FOUND	<input type="radio"/> ERROR					
<b>Q6.</b>	In fixed-point binary arithmetic, what happens if an addition operation produces a result larger than the allocated bits?				1	2	2
	<input type="radio"/> The result is stored as is	<input type="radio"/> The sign bit is adjusted					
	<input type="radio"/> The result is rounded to zero	<input checked="" type="radio"/> Overflow occurs					
<b>Q7.</b>	The DMA controller has _____ register.				1	1	1
	<input type="radio"/> 2	<input type="radio"/> 3					
	<input checked="" type="radio"/> 4	<input type="radio"/> 1					
<b>Q8.</b>	A pipeline stall can be used to resolve which type of hazard in pipeline processing?				1	2	2
	<input type="radio"/> Data Hazard	<input type="radio"/> Structural Hazard					
	<input type="radio"/> Control Hazard	<input checked="" type="radio"/> All of these					
<b>Q9.</b>	In a pipeline, what is the purpose of the "Execute" stage?				1	3	2
	<input type="radio"/> To fetch the next instruction	<input type="radio"/> To decode the instruction					
	<input checked="" type="radio"/> To perform the operation specified by the instruction	<input type="radio"/> To write the result to memory					

**Q10.** In the Micro programmed control unit, the Micro program consisting of \_\_\_\_\_ is stored in the control memory of the control unit. 1 1 1

- ☐ Instruction
 ☒ Micro Instruction
 ☐ Micro Program
 ☐ Macro instruction

### Section 2 (Answer all question(s))

Marks CO BL

**Q11.** Explain the address bus in the computer system.

2 1 1

Rubric	Marks
Explanation about address bus	2

**Q12.** Describe the Von-Neumann architecture with its labeled diagram.

3 2 2

Rubric	Marks
Explanation of Von-Neumann architecture	2
Labeled diagram of Von-Neumann architecture	1

**Q13. (a)** What is the instruction cycle? Draw a flow chart and explain the fetch, decode, and execute phases of an instruction cycle.

5 3 2

Rubric	Marks
Definition of the instruction cycle.	1
Flowchart Diagram	1
explain the fetch, decode, and execute phases of an instruction cycle.	3

(OR)

**(b)** Explain the concept of RTL and discuss its different types.

Rubric	Marks
Definition of RTL	2
Discuss its different types.	3

### Section 3 (Answer all question(s))

Marks CO BL

**Q14.** How is the CPU organized with stack implementation?

2 2 2

Rubric	Marks
CPU organized with stack implementation	2

**Q15. (a)** What do you understand by addressing mode? Explain different types of addressing modes used in basic computer systems.

8 4 3

Rubric	Marks
Definition of Addressing Mode.	2
Explanation of Different Types of Addressing Modes (at least four types)	6

(OR)

**(b)** Explain the function of the control unit and differentiate between hardwired and microprogrammed control units.

Rubric	Marks
Function of the control unit	2
Differentiate between hardwired and microprogrammed control units.	6

#### Section 4 (Answer all question(s))

Marks CO BL

**Q16.** Draw and explain the memory hierarchy in a computer system.

3 3 2

Rubric	Marks
Diagram of for the memory hierarchy.	1
Explanation of the memory hierarchy.	2

**Q17. (a)** Define cache memory and discuss its key characteristics. Also, explain the different types of cache memory used in a computer system.

7 4 4

Rubric	Marks
Definition of Cache Memory – 2 Mark	2
Types of Cache Memory-2	2
Characteristics of Cache Memory (Speed, Size, Location, etc.) – 3 Marks	3

(OR)

**(b)** Explain division algorithm with flowchart. What do you understand by divide overflow condition that arises during division?

Rubric	Marks
Explanation of Division Algorithm	2
Flowchart Representation	2
Definition and Explanation of Divide Overflow Condition	3

#### Section 5 (Answer all question(s))

Marks CO BL

**Q18.** What is the use of I/O interface? How data is transferred asynchronously?

4 2 2

Rubric	Marks
What is the use of I/O interface?	2
How data is transferred asynchronously?	2

**Q19. (a)** Explain direct memory access. What is meant by burst transfer and cycle stealing?

6 4 3

Rubric	Marks
Explain direct memory access.	2
What is meant by burst transfer and cycle stealing?	4

(OR)

**(b)** Define & write the difference between Programmed I/O and Interrupt-Initiated I/O.

Rubric	Marks
Defination of Programmed I/O and Interrupt-Initiated I/O.	4
Difference between Programmed I/O and Interrupt-Initiated I/O.	2

**Section 6 (Answer any 2 question(s))**

Marks CO BL

**Q20.** Explain arithmetic pipeline with flowchart and example.

5 5 4

Rubric	Marks
Explanation all about the arithmetic pipeline	3
Flow chart of arithmetic pipeline	2

**Q21.** Describe pipeline hazards & its types. Explain one resolution method for each.

5 5 4

Rubric	Marks
Describe pipeline hazards and their types.	3
Explain one resolution method of pipeline hazards.	2

**Q22.** Explain parallel processing with an example & differentiate it from vector processing.

5 5 4

Rubric	Marks
Explination about parallel processing with an example.	3
Differentiate it from vector processing.	2

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