

Faculty of Engineering

End Semester Examination May 2025

EE3CO63 Computer System Architecture

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

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
Q1. 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		
Q2. 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		
Q3. 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		
Q4. 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		
Q5. 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		
Q6. 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		
Q7. 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		
Q8. 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		
Q9. 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
- Macro instruction

Section 2 (Answer all question(s))

Q11. Explain the address bus in the computer system.

Marks CO BL
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.

Marks CO BL
2 2 2

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

Section 3 (Answer all question(s))

Q14. How is the CPU organized with stack implementation?

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))

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

Marks CO BL
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))

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

Marks CO BL
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
Definition 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

5 5 4

Q20. Explain arithmetic pipeline with flowchart and example.

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
Explanation about parallel processing with an example.	3
Differentiate it from vector processing.	2
