

Enrollment No.....



**Faculty of Engineering**  
**End Sem (Odd) Examination Dec-2022**  
**CS3CO22 / CS3CO34 / IT3CO20**  
**Computer System Architecture**

Programme: B.Tech.

Branch/Specialisation: All

**Duration: 3 Hrs.****Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. The ALU makes use of \_\_\_\_\_ to store the intermediate results. **1**  
 (a) Accumulators (b) Registers (c) Heap (d) Stack
- ii. Subtraction in computers is carried out by- **1**  
 (a) 1's complement (b) 2's complement  
 (c) 3's complement (d) 9's complement
- iii. Which addressing mode execute its instructions within CPU without the necessity of reference memory for operands? **1**  
 (a) Implied mode (b) Immediate mode  
 (c) Direct mode (d) Register mode
- iv. Which of the following is not a function of pass-1 of an assembler? **1**  
 (a) Generate data (b) Keep track of LC  
 (c) Remember literals (d) Remember values of symbols
- v. The result of subtraction using 2's complement of 1111-0010 will be \_\_\_\_\_ **1**  
 (a) 11101 (b) 1101 (c) 11011 (d) 1011
- vi. In Booth's multiplication algorithm, for Multiplier 1000 and multiplicand =1100 then how many numbers of cycles are required to get the correct multiplication result? **1**  
 (a) 5 (b) 2 (c) 8 (d) 4
- vii. \_\_\_\_\_ method is used to map logical addresses of variable length into physical memory. **1**  
 (a) Paging (b) Overlays  
 (c) Segmentation (d) Paging with segmentation
- viii. \_\_\_\_\_ translates/convert the logical address into the physical address. **1**  
 (a) Translator (b) Compiler (c) MMU (d) Linker

P.T.O.

[2]

- ix. Any condition that causes a processor to stall is called as \_\_\_\_\_. **1**  
 (a) Hazard (b) Page fault  
 (c) System error (d) None of these
- x. \_\_\_\_\_ have been developed specifically for pipelined systems. **1**  
 (a) Utility software (b) Speed up utilities  
 (c) Optimizing compilers (d) None of these
- Q.2 i. Explain the types of computers with example. **2**  
 ii. Draw and explain basic functional unit of computer system. **3**  
 iii. What is microoperations? Explain arithmetic, logic and shift microoperations in detail. **5**
- OR iv. Explain bus structure in detail and draw diagram of common bus structure. **5**
- Q.3 i. What is memory reference instructions? **2**  
 ii. Define and explain addressing modes with diagrams and examples. **8**
- OR iii. Explain instruction cycle using flowchart and memory reference registers. **8**
- Q.4 i. Show addition and subtraction of two signed magnitude data with their hardware implementation. **3**  
 ii. Multiply (+7) \*(+12) using Booth's multiplication algorithm. **7**
- OR iii. Explain division algorithm with flowchart. What do you understand by divide overflow condition that arises during division? **7**
- Q.5 i. What is the use of I/O interface? How data is transferred asynchronously? **4**  
 ii. How priority interrupt is handled by CPU? Explain both Software and hardware priority interrupt. **6**
- OR iii. Explain associative memory with its mapping techniques. **6**
- Q.6 Attempt any two:  
 i. Explain arithmetic pipeline with flowchart and example. **5**  
 ii. What is an array processor and types of array processor? **5**  
 iii. Explain multiprocessor architecture and multicore architecture. **5**

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**Marking Scheme**  
**CS3CO22- CS3CO34- IT3CO20**  
**Computer System Architecture**

Q.1	i)	The ALU makes use of _____ to store the intermediate results. <b>a) Accumulators</b>	<b>1</b>
	ii)	Subtraction in computers is carried out by <b>b) 2's complement</b>	<b>1</b>
	iii)	Which addressing mode execute its instructions within CPU without the necessity of reference memory for operands? <b>d) Register Mode</b>	<b>1</b>
	iv)	Which of the following is not a function of pass-1 of an assembler? <b>a) Generate data</b>	<b>1</b>
	v)	The result of subtraction using 2's complement of 1111-0010 will be _____ <b>b) 1101</b>	<b>1</b>
	vi)	In Booth's multiplication algorithm, for Multiplier 1000 and multiplicand =1100 then how many numbers of cycles are required to get the correct multiplication result? <b>d) 4</b>	<b>1</b>
	vii)	_____ method is used to map logical addresses of variable length into physical memory. <b>c) Segmentation</b>	<b>1</b>
	viii)	_____ translates/convert the logical address into the physical address. <b>c) MMU</b>	<b>1</b>
	ix)	Any condition that causes a processor to stall is called as _____ <b>a) Hazard</b>	<b>1</b>
	x)	_____ have been developed specifically for pipelined systems. <b>c) Optimizing compilers</b>	<b>1</b>
Q.2	i.	Explain the types of computers with example. - <b>2 types (1 mark each)</b>	<b>2</b>
	ii.	Draw and explain basic functional unit of computer system. <b>Diagram- 1mark, explain- 2marks</b>	<b>3</b>
	iii.	What is microoperations and explain Arithmetic, logic and shift microoperations in detail. <b>Microoperations- 2marks, Arithmetic -1mark, logic-1 marks and shift-1 mark</b>	<b>5</b>
OR	iv.	Explain Bus structure in detail and draw diagram of common bus structure. Explain <b>Bus structure- 2marks, diagram of common bus-3 marks</b>	<b>5</b>
Q.3	i.	What is memory reference instructions? – <b>2marks</b>	<b>2</b>
	ii.	Define and explain addressing modes with diagrams and examples. – <b>4 addressing modes (2 marks each)</b>	<b>8</b>

OR	iii.	Explain instruction cycle using flowchart and memory reference registers. <b>Explain-2 marks, flowchart-3 marks, memory ref- 3 marks</b>	<b>8</b>
Q.4	i.	Show addition and subtraction of two signed magnitude data with their hardware implementation? <b>Show addition and subtraction- 2marks, hardware implementation- 1marks</b>	<b>3</b>
	ii.	Multiply (+7) *(+12) using Booth's multiplication algorithm. <b>Tracing table- 5 marks, flowchart- 2marks</b>	<b>7</b>
OR	iii.	Explain division algorithm with flowchart? What do you understand by divide overflow condition that arises during division? <b>Flowchart with example- 5 marks, divide overflow condition- 2 marks</b>	<b>7</b>
Q.5	i.	What is the use of I/O interface and how data is transferred asynchronously. <b>use of I/O interface-2 marks, data transfer- 2 marks.</b>	<b>4</b>
	ii.	How priority interrupt is handled by CPU. Explain both Software and hardware priority interrupt. <b>priority interrupt- 3 marks, both Software and hardware priority interrupt – 3marks.</b>	<b>6</b>
OR	iii.	Explain associative memory with its mapping techniques. <b>associative memory-3 marks, mapping techniques-3marks</b>	<b>6</b>
Q.6		Attempt any two:	
	i.	Arithmetic Pipeline with flowchart <b>-3 marks</b> and example- <b>2 marks.</b>	<b>5</b>
	ii.	What is an Array Processor – <b>2 marks</b> and types of Array Processor- <b>3marks</b>	<b>5</b>
	iii.	Explain multiprocessor architecture <b>-3 marks</b> and multicore architecture- <b>2 marks</b>	<b>5</b>

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