

**EVEN SEMESTER EXAMINATION, 2023 – 24**  
**2<sup>nd</sup> yr B.Tech. – AI&ML/CS&E**  
**Computer Organization and Architecture**

Max Marks: 100

Duration: 3:00 hrs

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	<p>Answer any four parts of the following.</p> <p>a) State about parallel processing. Explain Flynn's classification.</p> <p>b) Differentiate between hardwired and microprogrammed control unit.</p> <p>c) An 8-bit register contains the binary value 10011100. What is the register value after an arithmetic shift right? Starting from the initial number 10011100, determine the register value after arithmetic shift left and state whether there is an overflow.</p> <p>d) State about pipeline hazards. Classify pipeline hazards.</p> <p>e) What do you mean asynchronous data transfer? Define strobe control method in brief.</p> <p>f) Explain CISC and RISC with example.</p>	5x4=20
Q 2.	<p>Answer any four parts of the following.</p> <p>a) Calculate the page fault for a given string with the help of LRU page replacement algorithm, size of frames = 4 and string 1 2 3 4 2 1 5 6 2 1 2 3 7 6 2 3 1 2 3 6.</p> <p>b) Point out the issue occurs in distributed shared memory.</p> <p>c) Explain floating point representation with suitable example.</p> <p>d) Define pipeline. Outline the advantages and disadvantage of it.</p> <p>e) Outline the need of I/O addressing. Compare I/O mapped I/O with Memory mapped I/O.</p> <p>f) Explain different mode of data transfer.</p>	5x4=20
Q 3.	<p>Answer any two parts of the following.</p> <p>a) Write short notes on following-</p> <ol style="list-style-type: none"> <li>i. Locality of reference.</li> <li>ii. Interrupts.</li> </ol> <p>b) An address space is specified by 24 bits and the corresponding memory space by 16 bits.</p> <ol style="list-style-type: none"> <li>i. How many words are there in the address space?</li> <li>ii. How many words are there in the memory space?</li> <li>iii. If a page consists of 2K words, how many pages and blocks are there in the system?</li> </ol> <p>c) Explain in detail multiple bus organization with the help of diagram.</p>	10x2= 20
Q 4.	<p>Answer any two parts of the following.</p> <p>a) Why does DMA have priority over the CPU when both request a memory transfer? Discuss burst transfer, cycle stealing and DMA transfer in CPU.</p> <p>b) Define micro program sequencer. With block diagram discuss the working of micro program sequencer.</p> <p>c) Why a number of addressing mode is needed? By taking a suitable examples explain the following addressing modes:</p> <ol style="list-style-type: none"> <li>i. Direct</li> </ol>	10x2= 20

- ii. Index
- iii. Relative
- iv. Immediate
- v. Register.

Q 5. Answer any two parts of the following.  
a) Show the multiplication process of  $(20) \times (-19)$  using Booth's algorithm.  
b) Define cache memory. Explain associative and set associative mapping with suitable example.  
c) Draw and explain the flowchart for instruction cycle with neat diagram.

10x2= 20

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