

**I B. Tech II Semester Regular/Supplementary Examinations, July/August- 2023****COMPUTER ORGANIZATION**

(Common to CSE, IT)

Time: 3 hours

Max. Marks: 70

*Answer any five Questions one Question from Each Unit**All Questions Carry Equal Marks***UNIT-I**

1. a) What are the advantages of Grey codes? Discuss areas of application. [7M]  
 b) Explain operations on unsigned binary numbers and Perform the subtraction with the following unsigned binary numbers using 2's compliment [7M]  
 i) 11010-10000    iii) 11010-1101  
 ii) 100-110000    iv) 1010100-1010100

**(OR)**

2. a) Explain two level realizations using OR- AND and NOR-NOR with an example. [7M]  
 b) Simplify the expression  $F(A,B,C,D)=\pi(3,5,7,8,10,11,12,13)$  using K Map. [7M]

**UNIT-II**

3. a) Perform the realization of half adder and full adder using decoders and logic gates. [7M]  
 b) Design and draw a full subtractor which will use two half subtractors. [7M]

**(OR)**

4. a) Design a 4-bit combinational logic to subtract one bit from the other. Draw the logic diagram using NAND and NOR Gates. [7M]  
 b) What is a flip-flop? Design the basic flip-flop using NOR gates and explain the same. [7M]

**UNIT-III**

5. a) Explain various memory reference instructions an example. [7M]  
 b) Design a 4-bit adder/Subtractor and explain its function. [7M]

**(OR)**

6. a) Explain the addition and subtraction of the floating point numbers with flow chart. [7M]  
 b) Explain hardware implementation of Binary multiplier with example. [7M]

**UNIT-IV**

7. a) Explain the three techniques involved in addressing sequencing. [7M]  
 b) Write about far and near procedures and Macros with 8086 programming.. [7M]

**(OR)**

8. a) Explain how conditional branching is achieved in microprogrammed control. [7M]  
 b) Discuss various instruction sets available in 8086. [7M]

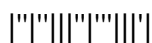
**UNIT-V**

9. a) Explain the features of segmented page mapping. [7M]  
 b) Explain mapping in a segmented page memory unit with the help of a block diagram. What do you understand by translation? Look aside buffer. [7M]

**(OR)**

- 10 a) Explain the following mapping techniques used for cache mapping i) Associative mapping cache ii) Direct mapping cache iii) Block-set-associative mapping cache [7M]  
 b) What is the difference between isolated IO and memory mapped I/O? State the advantages and disadvantages of each. [7M]

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1. a) Draw the flowchart for adding or subtracting two floating point binary numbers. [7M]
- b) Simplify the expression  $F(A,B,C)=\pi(0,3,6,7)$  using K Map. [7M]

**(OR)**

2. a) Differentiate between fixed point and floating point representation. [7M]
- b) Discuss the two-level NAND-NAND gate realization with an example. [7M]

**UNIT-II**

3. a) Discuss a few applications of multiplexers and distinguish between a multiplexer and a decoder. [7M]
- b) Define multiplexer. Construct a 4-to-1 multiplexer using logic gates. [7M]

**(OR)**

4. a) Draw the logic diagram of a 2 to the 4-line decoder using NOR gates, including an enable input. [7M]
- b) Design a 4-bit carry look ahead adder circuit. [7M]

**UNIT-III**

5. a) With a flow chart, explain the multiplication and division operations on two decimal Numbers P and Q. [7M]
- b) Derive and explain an algorithm for adding and subtracting two floating point binary numbers. [7M]

**(OR)**

6. a) Write about various instruction codes and its significance in detail. [7M]
- b) Design carry look-ahead adder and explain its function. [7M]

**UNIT-IV**

7. a) Explain the microinstruction format with examples. [7M]
- b) Write an assembly language program for calculating the factorial of a number using an 8086 microprocessor. [7M]

**(OR)**

8. a) Discuss how the fetch routine will be executed in microprogrammed control. [7M]
- b) Write an assembly language program for computing the sum of a given number using an 8086 microprocessor [7M]

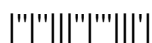
**UNIT-V**

9. a) Explain the relation between address and memory space in a virtual memory Systems. [7M]
- b) What is cache memory? Explain the different mapping functions with suitable examples. [7M]

**(OR)**

10. a) Explain various phases of asynchronous data transfer.. [7M]
- b) Discuss how the address mapping is done in paging. [7M]

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**UNIT-I**

1. a) Distinguish between error detection and error correction. Explain with an example how Hamming code is used for error detection. [7M]
  - b) Simplify the expression  $F(A, B, C, D) = \sum(0, 2, 5, 7, 8, 10, 13, 15)$  using K Map. [7M]
- (OR)**
2. a) "Parity checking can be used for error detection" – Justify your answer with an Example. [7M]
  - b) Discuss the features of ASCII, Alphanumeric Codes with suitable examples. [7M]

**UNIT-II**

3. a) Explain how a half-adder can be realized by using one X-OR gate and one AND. [7M]
  - b) Discuss the features of the T flip-flop. [7M]
- (OR)**
4. a) Design a Full adder using two NAND gates. [7M]
  - b) Discuss the applications of multiplexers and demultiplexers with examples. [7M]

**UNIT-III**

5. a) Explain various registers and computer instructions in detail.. [7M]
  - b) How addition and subtraction are done for decimal numbers? Give the pictorial representation for adding two decimal numbers [7M]
- (OR)**
6. a) Explain the basis for the Booths multiplication algorithm along with its constituent steps. What type of numbers will work? What are the limitations of the same? [7M]
  - b) Draw and explain the division of floating point numbers [7M]

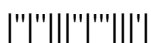
**UNIT-IV**

7. a) Discuss how a control unit initiates various microoperations. [7M]
  - b) Write an assembly language program for printing the reverse of a given number using an 8086 microprocessor. [7M]
- (OR)**
8. a) Explain the functions of Assembler, linker, locator and debugger in detail. [7M]
  - b) Write an assembly language program for printing the first n prime number using 8086 microprocessor. [7M]

**UNIT-V**

9. a) Explain the importance of set associative mapping. [7M]
  - b) What is auxiliary memory? Explain the various memory components used as auxiliary memory in computer systems. [7M]
- (OR)**
10. a) A two-way set associative cache memory uses blocks of four words. The cache can accommodate a total of 2048 words from the main memory. The main memory size is  $128 \text{ K} \times 32$ . i) Formulate all pertinent information required to construct the cache memory ii) What is the size of the cache memory. [7M]
  - b) How to map a virtual address to a physical address? Explain address mapping with pages and associative memory page table. [7M]

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**UNIT-I**

1. a) Explain different functional units of a digital computer with a neat sketch. [7M]  
 b) Discuss the two-level NOR-NOR gate realization with an example. [7M]

**(OR)**

2. a) Perform the following: [7M]  
 i)  $(110.101)_2 = ( )_{10}$  ii)  $(1.10101)_2 = ( )_{10}$   
 iii)  $(11010.1)_2 = ( )_{10}$  iv)  $110.10 \times 10.1$   
 b) Discuss the two-level AND-OR gate realization with an example. [7M]

**UNIT-II**

3. a) Discuss how a full adder uses two NOR gates. [7M]  
 b) Explain how a ripple counter can be realized by using T flip-flops. [7M]

**(OR)**

4. a) Design and draw a full adder that will use two half adders. [7M]  
 b) Explain the need for a ring counter with a suitable example. [7M]

**UNIT-III**

5. a) Explain the phases of instruction cycle in detail. [7M]  
 b) Explain how multiplication is done for floating point numbers with a flow chart [7M]

**(OR)**

6. a) Derive and explain an algorithm for adding and subtracting two floating point binary numbers. [7M]  
 b) Give a flow chart for doing decimal division and also explain the sequence of operation of it. [7M]

**UNIT-IV**

7. a) Discuss the general register organization in a CPU. [7M]  
 b) Explain how the macros, timing, and delay loops can be implemented in assembly language. [7M]

**(OR)**

8. a) Explain various addressing modes available in a CPU. [7M]  
 b) Draw the Architecture of 8086 Processor. [7M]

**UNIT-V**

9. a) What is auxiliary memory? Explain the various memory components used as auxiliary memory in computer systems. [7M]  
 b) Explain the following: i) Memory management using segmentation [7M]  
 ii) Memory management using paging

**(OR)**

10. a) How to map a virtual address to a physical address? Explain address mapping with pages and associative memory page table. [7M]  
 b) Explain the importance of cache memory and direct memory access with a suitable example. [7M]

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