

B022412(022)

**B. Tech (Fourth Semester) Examination,
April-May 2021**

(Computer Science and Engg. Branch)

COMPUTER SYSTEM ARCHITECTURE

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt all question. Part (a) of all questions is compulsory. Attempt any two parts from (b), (c) and (d). The figure in the right-hand margin indicate marks.

Unit-I

1. (a) Who controls the buses in DMA data transfer and how? 4
- (b) What do you understand by a subroutine? Discuss about parameter passing in subroutines. 8

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- (c) Write the differences between Hardwired and Micro programmed control unit. Draw the block diagram of both. 8
- (d) An instruction is stored at location 300 with its address field at location 301. The address field has the value 400, a processor register $R1$ contain the number 200. Evaluate effective address if the addressing mode of the instruction are 8
- (i) direct
 - (ii) immediate
 - (iii) relative
 - (iv) register indirect

Unit-II

2. (a) In a computer with 48-bit words, one bit is reserved for the sign. What will be the range of fixed-point integer number? 4
- (b) Describe a technique used to make the process of addition and subtraction by 2's complement number faster. 8
- (c) Explain Booth multiplication alongwith for 2's complement number using flow chart and example. 8

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- (d) Evaluate the following by using Restoring Division:
Divisor is 11 and Divided is 1000. 8

Unit-III

3. (a) Define the principle of locality of references. Which parameter is used to evaluate the performance of cache memory? 4
- (b) The access time of cache memory is 100 ns and that of main memory 1000 ns. It is estimated that 80% of the memory request for read and remaining for write. The hit ratio for read access only is 0.9. A write through procedure is used. 8
- (i) What is the average access time of system considering only memory read?
 - (ii) What is the average access time of system for both read and write required?
- (c) What do you mean by virtual memory? An address space is specified by 24 bits and corresponding memory space by 16 bits. 8
- (i) How many word are there in the address space?
 - (ii) How many words are there in the memory space?
 - (iii) If a page consists of 2K words, how many pages and blocks are there in the system?
- (d) Explain the working of associative memory with

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block diagram and derive the expression for match logic. 8

Unit-IV

4. (a) How Daisy Chaining priority interrupt works? 4
- (b) Explain the direct memory access scheme along with its advantages for data transfer between external devices and the main memory. 8
- (c) Explain in detail about the structure of a magnetic disk system. Also mention how we can find its capacity. 8
- (d) What do you understand by computer peripherals? Explain with proper explanation any two computer peripherals. 8

Unit-V

5. (a) Specify a pipeline configuration to carry out arithmetic operation $(A_i + B_i)(C_i + D_i)$ 4
- (b) Consider the execution of the program 15000 instruction a linear pipeline processor with a clock rate of 25 MHz. Assume that the instruction pipeline has 5 stages and that one instruction is issued per

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clock cycle. Calculate 8

- (i) speed up factor
(ii) efficiency
(iii) throughout.

- (c) What do you understand by parallel processing? Describe Flynn's classification of parallel processing. 8
- (d) What is the use of pipelining? Prove that an M-stage linear pipeline can be at most M times faster than that of non-pipelined serial processor. 8