

B. TECH
(SEM V) THEORY EXAMINATION 2022-23
COMPUTER ARCHITECTURE AND ORGANIZATION

Time: 3 Hours**Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20
- (a) Explain the Design Methodology.
 - (b) Describe a stack pointer.
 - (c) What is programmable logic devices?
 - (d) Define control word.
 - (e) Define Normalization of IEEE floating point representation.
 - (f) What is coprocessor?
 - (g) Explain the difference between horizontal organization and vertical organization.
 - (h) What is multiprogramming?
 - (i) Define VHDL. State the applications of VHDL.
 - (j) Explain the difference between program and software.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30
- (a) What are the components at processor design level in a computer system? Discuss various design issues at processor level.
 - (b) Give the overview of CPU behavior using a flowchart. Also draw the block diagram for processor memory communication with and without cache.
 - (c) Describe the design of a 4-bit carry look ahead adder.
 - (d) Write a note on the virtual memory and $2^{1/2}$ D memory organization.
 - (e) Draw and explain simple queuing model of computer system.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Explain the concept of stack organization.
 - (b) Represent the floating point in the IEEE standard format for the given number $1.00010100 \times 2^{-10}$.
4. Attempt any *one* part of the following: 10 x 1 = 10
- (a) What do you mean by the structure and behavior of a system? Give the behavioral VHDL description .of half adder.
 - (b) What is meant by nano programming? How does control unit of a computer function? Explain with the help of block diagram.

5. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Differentiate between Hardwired control and Micro programmed control. Explain each method in detail.
 - (b) Write a program to evaluate the arithmetic statement $X = (A+B) \times (C \times D)$. Use an accumulator type computer with two address instruction.
6. Attempt any *one* part of the following: 10 x 1 = 10
- (a) Explain how Booth's algorithm is suitable for signed number multiplication. Perform the multiplication of the following using Booth algorithm $(01110) + 14 \times -5 (11011)$.
 - (b) Explain the Daisy chaining mechanism for bus arbitration. Analyze the three bus arbitration methods-Daisy chaining, parallel and independent requesting with respect to communication reliability in the event of hardware failures
7. Attempt any *one* part of the following: 10 x 1 = 10
- (a) How a negative number is represented using 1's complement and 2's complement. Discuss the advantages and disadvantages of each representation.
 - (b) Write short notes on
 - (i) Data processing and Data movement
 - (ii) Encoder and Decoder
 - (iii) RISC and CISC
 - (iv) Virtual address and Physical address
 - (v) Multiplexer and De-multiplexer