Hall Ticket No | | | | | | | | | | | Course Code: ACSC07

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

B.Tech III SEMESTER END EXAMINATIONS (REGULAR / SUPPLEMENTARY) - FEBRUARY 2023

Regulation: UG20

COMPUTER ORGANIZATION AND ARCHITECTURE

Common to (CSE | CSE (AI&ML) | CSE (DS) | CSE (CS) | CSIT | IT)

Time: 3 Hours **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Classify different memory chips.Discuss the process of memory read and memory write operations with the help of timing diagrams. [BL: Understand| CO: 1|Marks: 7]

   (b) Show the code to perform the computation X=A+(B-C)+D using microprocessors that use the following instruction formats. Do not modify the values of A, B, C and D. If necessary use temporary location T to store intermediate results.

   i) Three- operand instructions
   ii) Two-operand instructions
   iii) One- operand instructions
   iv) Zero-operand instructions [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) State the arithmetic microoperations. Draw block diagram of a control memory and the associated hardware needed for selecting the next micro instruction address. [BL: Understand| CO: 2|Marks: 7]

   (b) Design a 4-bit arithmetic circuit for the addition, subtraction, increment and decrement by using 4X1 MUX and two selection lines. [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) Explain about floating-point representation in computer arithmetic with example. Why floating-point number is more difficult to represent and process than integer? [BL: Understand| CO: 3|Marks: 7]

   (b) Convert

   i) $(A03.56B)_{16}$ to decimal
   ii) $(101011101.10111)_2$ to Hexa decimal number system.
   iii) $(52.75)_{10}$ to binary
   iv) $(378.93)_{10}$ to octal number system. [BL: Apply| CO: 3|Marks: 7]

4. (a) Illustrate specific types of overflow and underflow encountered in standard FP representation. [BL: Understand| CO: 4|Marks: 7]

   (b) Perform the arithmetic operations in binary using signed 2's complement representation for the following numbers:

   i) (+41)+(-13) ii) (-41)-(-13) iii) (+41)-(+13) iv) (-41)+(+13). [BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) Differentiate isolated I/O and memory mapped I/O. Explain in detail about strobe control method of asynchronous data transfer. [BL: Understand| CO: 5|Marks: 7]

   (b) A two way set associative cache has lines of 16 bytes and a total size of 8 K bytes. The 64 Mbytes main memory is byte addressable. Show the format of main memory address. [BL: Apply| CO: 5|Marks: 7]

6. (a) Compare cache and main memory. Illustrate the mapping process involved in transformation of data from main to Cache memory. [BL: Understand| CO: 5|Marks: 7]

   (b) Describe the interrupt driven transfer scheme using block diagram. Distinguish interrupt driven data transfer scheme with DMA. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Elucidate inter processor communication. Explain in detail about crossbar switch used in multiprocessor organization. [BL: Understand| CO: 6|Marks: 7]

   (b) Explain in detail the six-segment pipeline showing the time it takes to process ten tasks with a space time diagram. [BL: Understand| CO: 6|Marks: 7]

8. (a) Discuss the characteristics of multi-processors. Distinguish the internal organization of attached array processor and SIMD array processor. [BL: Understand| CO: 6|Marks: 7]

   (b) Draw the arithmetic pipeline diagram and explain different pipelining techniques. How addressing modes affect the instruction pipelining. [BL: Understand| CO: 6|Marks: 7]