Exam Date & Time: 15-May-2023 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
END SEMESTER THEORY EXAMINATION - MAY 2023
II SEMESTER B.Sc (Applied Sciences) in Engg.

COMPUTER ORGANIZATION AND ARCHITECTURE [ICS 123]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Missing data, if any, may be suitably assumed

1) Draw a neat diagram to show connection between the processor and the main memory. List the steps needed to execute the machine instruction Load R2,LOC

A) in terms of data transfers between the various CPU components and main memory. (4)

B) Convert the following pairs of decimal numbers to 5-bit 2's-complement numbers, then perform addition and subtraction on each pair. Indicate whether overflow occurs for each case.
(a) 7 and 13
(b) -12 and 9 (4)

C) Explain the different types of computers. (2)

2) Explain with a neat diagram, how unsigned, signed integer and characters are represented in computers in a 32-bit word. (4)

A)

B) List and explain RISC-type addressing modes with assembler syntax and addressing function. (4)

C) Write a descriptive note on RISC and CISC instruction sets. (2)

3) Identify and explain the sequence of events during control unit operation of fetch cycle using an example. (4)

A)

B) What is a Program status word? Explain the fields in the Program status word. (4)

C) What are the advantages and disadvantages of condition codes in processing unit? (2)

4) Using Booth's algorithm for 2's complement multiplication, show how to multiply the multiplicand (-7) by the multiplier (-3). (4)

A)

B) How to represent Single Precision and Double Precision Numbers as per IEEE standard floating point representation? Show how a floating point decimal number 1259.125 is represented using the same. (4)

C) Write a descriptive note on different types of Read-Only Memories. (2)

5) Explain various Cache memory mapping techniques with an example for each. (4)

A)

B) Explain with timing diagram, input transfer on a synchronous bus. (4)

C) With the help of a neat diagram explain Virtual Memory Organization in computers. (2)

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