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Master of Computer Applications
Paper Code: MCAC102- Computer System architecture Kuldeep Sir
Unique Paper Code: 223421102
Semester I
April 2023
Year of admission: 2022

Time: Three Hours **Max. Marks: 70**

Instruction: All questions are compulsory. Question 1 carries 20 marks. Each question from 2 to 6 carry 10 marks. Attempt all the parts of a question together.

1. Write short note with an example: 5 × 4

   A). Memory stack organization.
   B). Direct memory access (DMA)
   C). RISC and CISC
   D). Interrupt cycle
   E). Programmed and Interrupt-initiated I/O in Data transfer

2. A). Construct a bus system using tri-state butters, for 4 registers of 4 bit each. 6
   B). Design a 8-bit combinational circuit incrementer. 4

3. A). Describe block diagram of RAM chip. data bus chip write 6
   B). Design a 4-bit combinational circuit shifter. 4

4. A). Please find out the total number of registers needed in overlapped RISC architecture where we have four windows with 44 registers in each. The number of local registers in each window is 10. And we have 12 registers that are common to all procedures. 6
   B). Design a 4-bit binary adder that uses two four-bit registers. Register A holds the binary number 0110 and register B holds 1111. The carry flip-flop is initially reset to 0. List the binary output values and the carry output of each flip-flop after every shift. 4

5. A). Design and Describe the flowchart for the Register and I/O reference instruction with timing signal. 6
   B). Simplify the expression using Boolean algebra. 4

   $F = X'Z + X'Y + XY'Z + YZ$

6. Design a detailed circuit for Accumulator Logic. Also show the circuit for load, increment and clear logic for Accumulator. 10