Paper ID [MC301]

(Please fill this Paper ID in OMR Sheet)

MCA (Sem. - 3rd)
COMPUTER SYSTEM ARCHITECTURE (MCA - 301) (N2)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

1) Attempt any one question from each Sections - **A, B, C & D**.

2) Section - E is **Compulsory**.

Section - A

$(1 \times 10 = 10)$

Q1) (a) Explain the data flip-flop?

(b) Simplify the expression $x = (A' + B)(A + B + D)D'$.

(c) Solve the expression $Z(A, B, C, D) = \Sigma (0,1,4,6,7,8,9,12,14,15)$ using K-map.

Q2) (a) Design a MOD13 Counter using J-K Flip Flop and NAND Logic Gates.

(b) Design the 8-Bit Full adder Circuit.

Section - B

$(1 \times 10 = 10)$

Q3) (a) Show the Block Diagram to execute the statement

$xT_3 : A \leftarrow B, B \leftarrow A$.

(b) Show the Hardware implementation of the following statements. The registers are 4 bits in length

$T_0 : A \leftarrow R_0$

$T_1 : A \leftarrow R_1$

$T_2 : A \leftarrow R_2$

$T_3 : A \leftarrow R_3$

Q4) Design a Logic Circuit of a processor with truth table.

Section - C

$(1 \times 10 = 10)$

Q5) (a) Write a micro program that compares two unsigned binary number stored in R1 & R2. The register containing the smaller number is then cleared. If the two numbers are equal, both numbers are cleared.

(b) Explain the following.

    (i). Micro operation   (ii) Micro instructions

    (iii) Micro program.

Q6) (a) Convert the following arithmetic expression from infix to reverse Polish notations.

    (i) . A*B + C*D + E*F.

    (ii) A*B + A* (B*D + C*E).

    (iii) (A*[B+C*(D+E)])/(F*(G+H)).

(b) What is RISC and CISC? Differentiate them.

Section - D

(1 × 10 = 10)

Q7) A computer uses chips of 1024x1 capacity.

(a) How many chips are needed and how should their address lines be connected to provide a memory capacity of 1024 bytes.

(b) How many chips are needed to provide a memory capacity of 16 K bytes? Explain in words how the chips are to be connected to address bus.

Q8) (a) Explain Virtual Memory.

(b) Explain the Auxiliary Memory.

Section - E

Q9) a) Draw the logic circuit for y = (a'+b+c)(a+b+c') using any of the universal Gate. **2**

b) Suppose a ROM has 8 input address lines, How many memory location does it have, Range them. **2**

c) Convert the 634 decimal into its BCD equivalent. **2**

d) Name the various Addressing Modes for pointing a data in a memory location. **3**

e) Explain the various types of Interrupts. **3**

f) What is a Cache memory? **4**

g) Differentiate between Microprogramming and Hardwired control unit. **4**

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