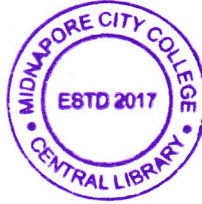# 2023

BCA 2nd Semester Examination

Digital Logic Design

PAPER — CC3T

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks.

*Candidates are required to give their answers
in their own words as far as practicable.*

Illustrate the answers wherever necessary.

Answer from **all** the Groups as directed.

GROUP—A

1. Answer *any* **five** questions :   2×5=10

    (a) Convert $(6EA9)_{16}$ into decimal.

    (b) Add (+84) and (–75) using 2's complement.

(2)

(c) Write the truth table of Ex-NOR gate.

(d) Implement OR gate using NAND gates only.

GROUP—B

2. Answer *any* **four** questions : 5×4=20

(a) Obtain the simplified expression in sum of products for the Boolean function : 5

$$F(A,B,C,D) = \Sigma(2,3,12,13,14,15)$$

(b) Design a combinational circuit which converts BCD to Excess-3 code. 5

(c) Explain the working and functions of decoders and encoders. Construct 2/4 line decoder with logic gates with enable input. 2+3=5

(d) Implement an odd parity generator for 3-bit using a decoder. 5

(e) What is flip-flop? Design a J-K master-slave flip-flop circuit diagram. 5

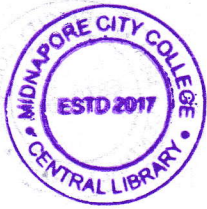(f) What is counter? What are the advantages and disadvantages of ripple counter? 2+3=5

(g) Draw the circuit diagram of ring counter.

(h) What is a parity bit generator?

/494 (Continued)

(3)

GROUP—C

3. Answer *any* **two** questions : 10×2=20

(a) (i) Design a MOD-10 counter.

(ii) What is shift register? Design and explain a serial in parallel-out shift register. 4+6=10

(b) (i) What is race around condition? How can this condition be removed?

(ii) Design a 16 : 1 MUX using 4 : 1 MUXs. 5+5=10

(c) Realize a full subtractor using decoders. 10

(e) Design a half-adder circuit.

(f) Differentiate between latch and flip-flop.

/494 (Turn Over)

(4)

(d) Write short notes on *any* **two** of the following : 5×2=10

   (i) Combinational circuit

  (ii) SISO register

 (iii) ASCII Code

 (iv) Seven-segment display

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