A–0819

Total Pages : 3 **Roll No. .....**

MCS-404/DCA-104

DIGITAL ELECTRONICS

(MSCIT/DCA)

Examination, June 2025

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

Long Answer Type Questions 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. (a) Explain Binary Coded Decimal (BCD) codes and their application in digital systems.

   (b) Convert (39)decimal to BCD and (101011.01)2 to BCD.

2. A logic circuit has a truth table output as F(A, B, C) = Σ(0, 1, 3, 7).

   (a) Represent the logic circuit using minterms.

   (b) Simplify the function using Boolean algebra and draw its logic circuit representation.

3. Simplify the following Boolean function using a five-variable Karnaugh Map :

   F(A, B, C, D, E) = Σ(0, 2, 4, 8, 10, 12, 14, 18, 22, 24, 26).

4. (a) Explain the design and working of a full adder circuit.

   (b) Show how two half adders can be combined to create a full adder.

5. Discuss the structure, working, and application of Flash Memory. Highlight the differences between NOR and NAND Flash memory architectures.

Section–B

Short Answer Type Questions 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Represent $(—57)_{10}$ in both One's Complement and Two's Complement forms in an 8-bit binary system.
2. Explain Unit Distance Codes and their importance in error correction.
3. State and prove De Morgan's theorems using examples.
4. Describe how prime implicants are generated in the Quine-McClusky method.
5. Design a NOR gate using only NAND gates and explain its working with a truth table.
6. Explain the concept of Master-Slave Flip-Flop with its block diagram and applications.
7. Explain the working of a MOD-10 (Decade) counter with timing diagrams.
8. Describe the read and write operations in RAM with the help of a diagram.

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