

--Question Starting--

Match the following Boolean algebra simplification techniques with their primary characteristics:

1. Karnaugh Map (K-Map)
 2. Quine-McCluskey Algorithm
 3. Algebraic Manipulation
 4. Consensus Theorem
- A. Uses a tabular method to systematically minimize Boolean functions with a focus on larger number of variables
 - B. Relies on Boolean identities to reduce expressions without a visual map
 - C. Employs visual grouping to identify minimal sums or products, especially effective for up to 6 variables
 - D. Applies a theorem to eliminate redundant terms by considering consensus terms

Choose the correct answer from the options given below:

- (1) 1-C, 2-A, 3-B, 4-D
- (2) 1-D, 2-C, 3-A, 4-B
- (3) 1-C, 2-B, 3-D, 4-A
- (4) 1-A, 2-D, 3-C, 4-B

Answer Key: 3

Solution:

? Karnaugh Map: A visual method that groups adjacent 1s or 0s in a grid to find minimal expressions, effective for small to moderate variable counts.

? Quine-McCluskey: A tabular, algorithmic approach that systematically reduces Boolean functions, suitable for larger functions beyond K-Map's practicality.

? Algebraic Manipulation: Simplification using Boolean identities directly on expressions without visual aids.

? Consensus Theorem: A specific Boolean theorem used to eliminate redundant terms by considering consensus products.

Hence, Option (3) is the right answer.

--Question Starting--

3. Match the following control signal sequences with their corresponding control cycle operations in a microprogrammed control unit:

1. Fetch Cycle
 2. Decode Cycle
 3. Execute Cycle
 4. Memory Read/Write Cycle
- A. Accesses memory to retrieve instruction or data
 - B. Interprets the fetched instruction to determine control signals
 - C. Performs the actual operation specified by the instruction
 - D. Transfers instruction or data between CPU registers and memory

Choose the correct answer from the options given below:

- (1) 1-D, 2-B, 3-C, 4-A
- (2) 1-A, 2-D, 3-B, 4-C
- (3) 1-B, 2-A, 3-D, 4-C
- (4) 1-C, 2-D, 3-A, 4-B

Answer Key: 1

Solution:

? Fetch Cycle: The CPU accesses memory to retrieve the instruction, i.e., memory read operation.

? Decode Cycle: The fetched instruction is interpreted to determine subsequent control signals.

? Execute Cycle: The CPU performs the operation specified by the instruction, such as arithmetic or logic operation.

? Memory Read/Write Cycle: Data transfer occurs between CPU registers and memory during read/write operations.

Hence, Option (1) is the right answer.