

(Answer all the Questions)

- 1) a) Perform the following operations using 2's complement method:

(i) $35 - 23$ (ii) $23 - 35$

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Reduce the following Boolean expressions into the indicated number of literals:

(i) $A^1B(D^1+C^1D) + B(A+A^1CD)$ to 1 literal (ii) $(x^1.y^1+z)^1 + z + xy + wz$ to 3 literals

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 2) a) Express the Boolean function $F=AB+B^1C$ as a sum of min terms and product of max terms.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Convert the decimal number 986 to base 2, base 5 and base 8.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- 3) a) Given the 4 bit information code 1011 generate the Hamming code by using odd Parity.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Draw a logic diagram to implement Boolean expressions $Y=A(B \oplus D) + C^1$

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 4) Minimize the following Boolean functions using K-map:

(i) $F(W, X, Y, Z) = \Sigma(0,1,2,4,5,6,8,9,12,13,14)$

(ii) $F(A,B,C,D) = \Pi(1,2,3,4,6,9,10,12,14) + d(5,7,11)$

MARKS: 5, 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- 5) Simplify the following Boolean function using tabulation method.

$F(A, B, C, D, E) = \Sigma m(0,1,2,8,9,15,17,21,24,25,27,31)$

MARKS: 10M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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(OR)

- 6) a) Implement the Boolean function $F = (AB^1+A^1B)(C+D^1)$ using NOR gates.

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Prove that OR-NAND=NOR-OR

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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Sub: DE (A30421)
Time: 1Hr 30Min

Date: 10-12-2021
Max Marks: 30M

(Answer all the Questions)

- 1) a) Convert the following to Decimal and then to Hexadecimal. (i) 1234_8 (ii) 11001111_2

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Perform the following operations using 2's complement method:

(i) $(101011) - (110011)$ (ii) $(11101) - (11100)$.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 2) a) Convert the given expression in to canonical SOP form and POS form $= (AB+C)(B+C'D)$.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Implement the following Boolean function using NAND gates $Y = A(CD+B)+BC'$.

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- 3) a) What are universal gates? Realize AND, OR, NOT, XOR gates using universal gates

MARKS: 10M	UNIT-I	CO: 1	COGNITIVE LEVEL: Understand
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(OR)

- 4) Minimize the following Boolean expression using K-map for the 4 -variable:

i) $F = \Sigma (0,2,4,5,6,8,9,12,13,14)$ ii) $F = \Sigma (4,5,6,7,12,13,14) + \Sigma d(1,9,11,15)$

MARKS: 5,5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- 5) Simplify the following Boolean function using Quine method.

$F(w, x, y, z) = \Sigma m(0, 1, 2, 5, 6, 7, 8, 9, 10, 14)$

MARKS: 10M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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(OR)

- 6) a) Minimize the Boolean functions using k-map $X'Z'+Y'Z'+YZ'+XY$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Write the properties of Ex-OR gate.

MARKS: 5M	UNIT- II	CO: 2	COGNITIVE LEVEL: Understand
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Sub: DE (A30421)
Time: 1Hr 30Min

Date: 10-12-2021
Max Marks: 30M

(Answer all the Questions)

- 1) Encode the decimal number 469 in
(i) Binary (ii) BCD (iii) ASCII (iv) EXCESS-3 (v) Gray code

MARKS: 10M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 2) a) What is the difference between canonical form and standard form? Explain with example.

MARKS: 10M	UNIT-I	CO: 1	COGNITIVE LEVEL: Understand
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- b) Find the complement of the following Boolean functions

i) $Y = XY' + X'Y$ ii) $Y = (A'B + CD)E' + E$

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- 3) Reduce the following Boolean expressions into the indicated number of literals:

(i) $A^1B(D^1+C^1D) + B(A+A^1CD)$ to 1 literal (ii) $(x^1.y^1+z)^1 + z + xy + wz$ to 3 literals

MARKS: 5,5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 4) Simplify the following Boolean function using tabulation method.

$F(w, x, y, z) = \sum m(1, 2, 3, 5, 9, 12, 14, 15) + d(4, 8, 11)$

MARKS: 10M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- 5) a) Minimize the following Boolean functions using K-map:

$F(A, B, C, D, E) = \sum (0, 2, 4, 6, 9, 13, 21, 23, 25, 29, 31)$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Determine prime implicants and essential prime implicants $F(w, x, y, z) = \sum m(0, 2, 3, 5, 7, 8, 9, 10, 11, 13, 15)$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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(OR)

- 6) a) Minimize the following Boolean expression using K-map for the 4-variable:

$F = AB^1CD^1 + A^1BC + A^1B^1C + A^1B^1C^1 + AB^1C^1D$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Explain about AOI and OAI implementation with example.

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Understand
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Sub: DE (A30421)
Time: 1Hr 30Min

Date: 10-12-2021
Max Marks: 30M

(Answer all the Questions)

- 1) a) Perform the following operations using 2's complement method:

(i) $54 - 31$ (ii) $31 - 54$

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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- b) Differentiate between canonical form and standard SOP form

MARKS: 5M	UNIT-I	CO: 1	COGNITIVE LEVEL: Understand
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(OR)

- 2) Explain in detail about different types of binary codes.

MARKS: 10M	UNIT-I	CO: 1	COGNITIVE LEVEL: Understand
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- 3) Draw a NAND logic diagram that implements the complement of following Boolean functions

$$F(A,B,C,D) = \sum m(0,1,2,3,4,8,9,10,11,12)$$

MARKS: 10M	UNIT-I	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 4) a) Implement the following function using NAND gate $F = A(CD+B) + BC'$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Implement the Boolean function using k-map

(i) $F(W, X, Y, Z) = \sum m(1, 3, 13, 15) + d(8, 9, 10, 11)$

(ii) $F(P, Q, R, S) = \prod M(0, 2, 4, 10, 11, 14, 15)$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- 5) a) Simplify the following Boolean function using tabulation method.

$$F(A, B, C, D, E) = \sum m(0, 1, 2, 8, 9, 15, 17, 21, 24, 25, 27, 31)$$

MARKS: 10M	UNIT-II	CO: 1	COGNITIVE LEVEL: Apply
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(OR)

- 6) a) Determine prime implicants, essential prime implicants and non-essential prime implicants.

$$F = \sum m(1,5,6,7,11,12,13,15)$$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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- b) Prove that $\text{NAND-AND} = \text{AND-NOR}$

MARKS: 5M	UNIT-II	CO: 2	COGNITIVE LEVEL: Apply
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