Q.1) Max Marks: 1

The base for the for relation 26 * 35 = 822 is _____

Correct Answer

Solution: (14)

Solution: 14

The relation will be expanded as:

$\Rightarrow (26)_b * (35)_b = (822)_b$

$\Rightarrow (2b + 6) * (3b + 5) = (8b^2 + 2b + 2)$

$\Rightarrow 6b^2 + 10b + 18b + 30 = 8b^2 + 2b + 2$

$\Rightarrow 28b - 2b + 30 - 2 = 2b^2$

$\Rightarrow 26b + 28 = 2b^2$

$\Rightarrow b^2 - 13b - 14 = 0$

$\Rightarrow b^2 - 14b + b - 14$

$\Rightarrow b(b - 14) + 1(b - 14)$

$\Rightarrow (b + 1)(b - 14) = 0$

Hence, b has two values, -1 and 14. Since -1 is not possible, therefore, the base of the relation will be 14.

Your Answer is wrong (9)

Time taken to answer this question 00:00:08 hrs

Q.2) Max Marks: 1

The number of literals in the minimal expression of QR + PR' + PQ + QRS are _____

Correct Answer

Solution: (4)

Solution: 4

For the given expression QR + PR' + PQ + QRS:

$\Rightarrow QR(1 + S) + PR' + PQ$

$\Rightarrow QR + PR' + PQ$ //(1 + S) = 1

$\Rightarrow QR + PR'$ //consensus theorem

According to consensus theorem:

$\Rightarrow QR + PR' + PQ$

$\Rightarrow QR + PR' + PQ(R + R')$

$\Rightarrow QR + PR' + PQR + PQR'$

$\Rightarrow QR(1 + P) + PR'(1 + Q)$

$\Rightarrow QR + PR'$

Hence, number of literals are 4.

Your Answer is wrong (6)

Time taken to answer this question 00:03:03 hrs

Q.3) Max Marks: 1

For the boolean function F(p, q, r, s) = pq + p'q'r. What will the correct form for sum of product and product of sum?

A $F = \Sigma(0, 1, 4, 5, 6, 7, 8, 9, 10, 11), F = \pi(2, 3, 12, 13, 14, 15)$

B $F = \Sigma(2, 3, 12, 13, 14, 15), F = \pi(0, 1, 4, 5, 6, 7, 8, 9, 10, 11)$ Correct Option | Attempted

Solution: (B)

Solution: (ii)

On expanding the expression pq + p'q'r we will get:

$\Rightarrow pq(r + r')(s + s') + p'q'r(s + s')$

$\Rightarrow pqrs\ (M_{15}) + pqrs'\ (M_{14}) + pqr's\ (M_{13}) + pqr's'\ (M_{12}) + p'q'rs\ (M_3) + p'q'rs'\ (M_2)$

Since, it is in sum of product form, hence, product of sum will be complement of this i.e $\pi(0, 1, 4, 5, 6, 7, 8, 9, 10, 11)$

Hence, the correct option is (ii)

C $F = \Sigma(0, 2, 3, 10, 12, 13, 14, 15), F = \pi(1, 4, 5, 6, 7, 8, 9, 11)$

D None of the above

Time taken to answer this question 00:02:27 hrs

Q.4) Max Marks: 1

Which of the following is the correct simplification for the function F(w, x, y, z) = wxz + w'y'z' + w'x + w'yz' + wx'z' ?

A xz + w'z' + x'z'

B w'x + xz + x'z'

C **Both (i) and (ii)** Correct Option

Solution: (c)

Solution: (iii)

On simplification of the expression wxz + w'y'z' + w'x + w'yz' + wx'z' we will get:
=> wxz + w'z' + w'x + wx'z'
=> x (wz + w') + z' (w' + wx')
=> x ((w + w') (z + w')) + z' ((w' + w) (w' + x'))
=> x (z + w') + z' (w' + x')
=> xz + w'x + w'z' + x'z'
=> w'x + xz + x'z' OR xz + w'z' + x'z' //*consensu theorem*

Hence, the correct option is (iii)

D Neither (i) nor (ii) Your answer is **Wrong**

Time taken to answer this question 00:05:34 hrs

Q.5) Max Marks: 1

Which of the following is the correct simplified expression in sum of product for the function F(A, B, C, D) = π(2, 3, 12, 13, 14, 15)?

A A'C' + A'B' + AB'

B AC' + A'B + AB'

C A'C' + A'B + AB' Correct Option

Solution: (c)

Solution: (iii)

The k-map of the given expression will be:

AB\CD	00	01	11	10
00	1	1	0	0
01	1	1	1	1
11	0	0	0	0
10	1	1	1	1

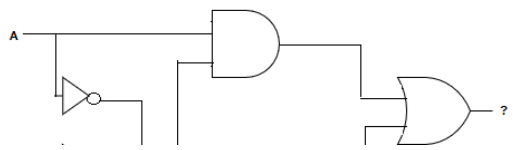
Hence, the simplified expression will be: A'C' + A'B + AB'

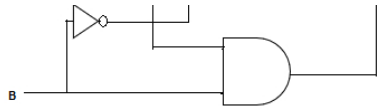
D None of the above Your answer is **Wrong**

Time taken to answer this question 00:02:35 hrs

Q.6) Max Marks: 1

The output of the following circuit will be:





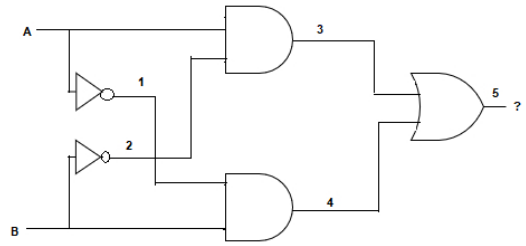
A $A' + B'$

B $A \odot B$

C $A \oplus B$ — Correct Option | Attempted

Solution: (C)

Solution: (iii)



Expression at 1 will be: A'
Expression at 2 will be: B'
Expression at 3 will be: AB'
Expression at 4 will be: A'B
Expression at 5 will be: AB' + A'B = $A \oplus B$
Hence, the correct option is (iii)

D A'B'

Time taken to answer this question 00:00:34 hrs

Q.7) Max Marks: 1

The product of $(135)_6$ and $(43)_6$ is _____

Correct Answer

Solution: (11213)
$(135)_6 = (59)_{10}$
$(43)_6 = (27)_{10}$
$(59)_{10} \times (27)_{10} = (1593)_{10}$
Therefore, $(1593)_{10} = (11213)_6$

Your Answer is wrong (1813)

Time taken to answer this question 00:02:23 hrs

Q.8) Max Marks: 1

Which of the following is correct conversion of $(623.77)_8$ into hexadecimal?

A 183.FC

B 178.FB

C 178.FC

D None of the above — Correct Option | Attempted

Solution: (D)

Solution: (iv)
$(623.77)_8 = (403.9843)_{10}$
Now $(403)_{10} = (193)_{16}$
While, $(0.9843)_{10} = 0.9843 * 16 = 15.75 \Rightarrow 15 \Rightarrow F$

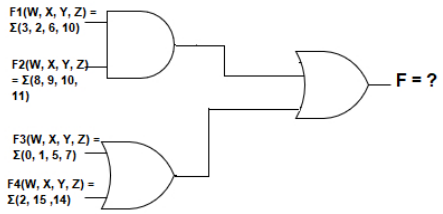
$0.75 * 16 = 12 \Rightarrow C$

Hence, the answer should be 193.FC

Time taken to answer this question 00:01:24 hrs

Q.9) Max Marks: 1

Which of the following option is correct canonical form of function F for the given logic diagram?



A $F(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 7, 15, 14, 10)$ — Correct Option | Attempted

Solution: (A)

Solution: (i)
For AND gate we perform "intersection" of the minterms while for OR gate we perform "union of the minterms"
The intersection of F1 and F2 will be:
$F1(W, X, Y, Z) = \Sigma(3, 2, 6, 10) \cap F2(W, X, Y, Z) = \Sigma(8, 9, 10, 11) = f1(W, X, Y, Z) = \Sigma(10)$

The union of F3 and F4 will be:
$F3(W, X, Y, Z) = \Sigma(0, 1, 5, 7) \cup F4(W, X, Y, Z) = \Sigma(2, 15, 14) = f2(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 7, 14, 15)$

The union of f1 and f2 will be:
$f1(W, X, Y, Z) = \Sigma(10) \cup f2(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 7, 14, 15) = F(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 7, 15, 14, 10)$
Hence, the correct option is (iv)

B $F(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 7, 9, 10, 14, 15)$

C $F(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 15, 14, 10)$

D None of the above

Time taken to answer this question 00:01:29 hrs

Q.10) Max Marks: 1

Which is the correct simplified expression in sum of product for the given function F(W, X, Y, Z) = X'Y'Z' + XYZ' + WXYZ' with dont care, d is given as X'YZ' + W'XY'Z

A X'Z' + YZ' — Correct Option

Solution: (A)

Solution: (i)

The simplification of the function X'Y'Z' + XYZ' + WXYZ' will be:
=> WX'Y'Z' + W'X'Y'Z' + WXYZ' + W'XYZ' +WXYZ'
On removing redundant terms we will get:
=> WX'Y'Z' (M_8) + W'X'Y'Z' (M_0) + WXYZ' (M_{14}) + W'XYZ' (M_6)

The simplification of the don't care expression X'YZ' + W'XY'Z will be:
=> WX'YZ' (M_{10}) + W' X'YZ' (M_2) +W'XY'Z (M_5)

Based on this the k-map will be:

WX\YZ	00	01	11	10
00	1			Φ
01		Φ		1
11				1
10	1			Φ

Since, there are two quads formed, hence the expression will be : X'Z' +YZ'

B X'Z' + Y'Z'

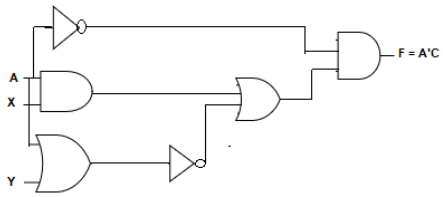
C W'Z' + YZ'

D None of the above — Your answer is Wrong

Time taken to answer this question 00:03:39 hrs

Q.11) Max Marks: 2

Determine the value of X and Y in the below given circuit implementation of function F(A, B, C).

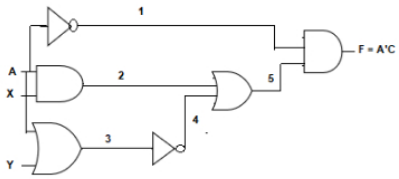


A X = B' , Y = C

B X = B , Y = C' Correct Option

Solution: (B)

For the given circuit:



Expression at 1 will be: A'
Expression at 2 will be: A X
Expression at 3 will be: A + Y
Expression at 4 will be: $(A + Y)' = A'Y'$
Expression at 5 will be (2 + 4) : $AX + A'Y'$
Final expression F will be: $A' . (AX + A'Y')$.
On simplifying this we will get:
$=> A'.AX + A'.A'Y'$
$=> 0 + A'Y'$
$=> A'Y'$
Since final $F = A'C$
Therefore $Y' = C$ or $Y = C'$ and X could be either B, C, B' or C'
Since, there is only 1 option with $Y = C'$. Hence, the correct option is (ii).

C X = C, Y = B Your answer is **Wrong**

D None of the above

Time taken to answer this question 00:02:24 hrs

Q.12) Max Marks: 2

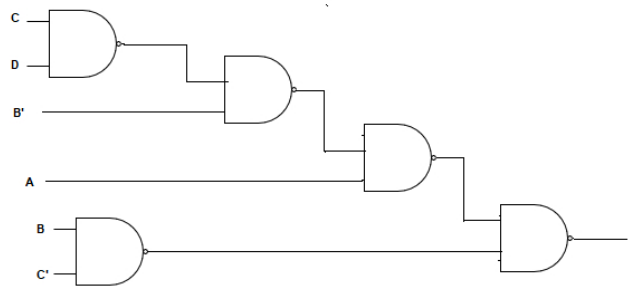
The minimum number of NAND gates required to implement the function F(A, B, C, D) = AB + ACD + BC' is _____
NOTE: Only 2 input NAND gates are available and both complemented and non complemented forms are available.

Correct Answer

Solution: (5)

Solution: 5

Following will be the realization of the expression AB + ACD + BC'



Your Answer is wrong (3)

Time taken to answer this question 00:00:18 hrs

Q.13) Max Marks: 2

Which of the following statements are correct?

I. The complement of boolean expression [(XY)'X][(XY)'Y] could be reduced to 1.

II. In Switching expressions, inversion and cancellation is allowed i.e X + Y = X + Z

A **Only I** — Correct Option

Solution: (A)

Solution: (i)

I. For the given expression complement will be ([(XY)'X][(XY)'Y])':
=> [(XY)'X]' + [(XY)'Y]'
=> [((XY)')' + X'] + [((XY)')' + Y']
=> XY + X' + XY + Y'
=> XY + X' + Y'
=> (X + X') (Y + X') + Y'
=> Y + X' + Y' //(X + X') = 1
=> 1 //(Y + Y') = 1
Hence, this is true.

II. In Switching expressions, inversions and cancellation of variables is not allowed i.e. X + Y = X + Z is not allowed as we cannot cancel from LHS and RHS.

B **Only II**

C **Both I and II**

D **Neither I nor II** — Your answer is **Wrong**

Time taken to answer this question 00:00:39 hrs

Q.14) Max Marks: 2

The minimum number of bits required to represent -32 in signed 2's complement form are _____

Correct Answer | Attempted

Solution: (6)

Solution: 6

Since the range of the signed 2's complement numbers are $-2^{(n-1)}$ to $2^{(n-1)} - 1$
=> $-2^{(n-1)} <= -32$
=> $2^{(n-1)} >= 32$
=> $2^{(n-1)} >= 2^5$
=> n - 1 = 5
=> n = 6

Time taken to answer this question 00:00:55 hrs

Q.15) Max Marks: 2

Consider the following lists I and II:

List I	List II
a. a'bc' + a'b'c is dual of	1. ab + a'c + bc
b. a'b'c + a'bc + ab' could be minimized as	2. (a' + b + c) (a' + b' + c')
c. Complement of ab'c' + abc is	3. (a' + b + c') (a' + b' + c)
d. ab + a'c is minimal form of	4. a' c + ab'

Which of the following matching is correct about list I and list II?

A **a - 2, b - 4, c - 3, d - 1**

B **a - 2, b - 1, c - 3, d - 4**

C **a - 3, b - 4, c - 2, d - 1** — Correct Option | Attempted

Solution: (C)

Solution: (iii)

a. The dual of a'bc' + a'b'c is (a' + b + c') + (a' + b' + c) => option 3 from list II

b. a'b'c + a'bc + ab' could be minimized as => a'c(b + b') + ab' => a'c + ab' => option 4 from list II
c. Complement of ab'c' + abc is (a' + b + c) (a' + b' + c') => option 2 from list II
d. ab + a'c is minimal form of => ab + a'c + bc
=> ab + a'c + bc
=> ab + a'c + bc(a + a')
=> ab + a'c + abc + a'bc
=> ab(1 + c) + a'c (1 + b)
=> ab + a'c

Hence, the correct option is (iii)

D **a - 3, b - 1, c - 2, d - 4**

Time taken to answer this question 00:03:08 hrs

close