

digi
MENTO
EDUCATING ON GO...

DIGITAL LOGIC

WorkBook

2018

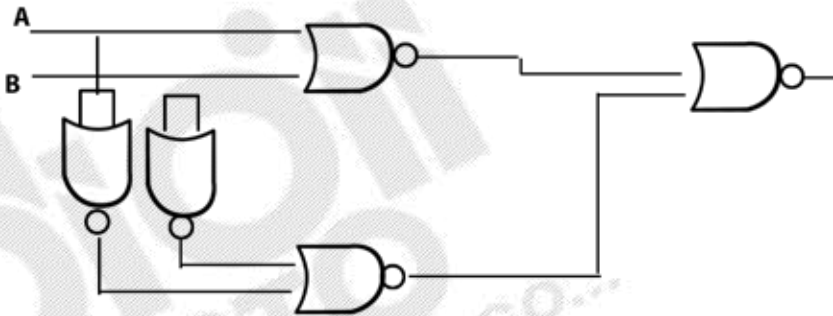
DigiMento Educational Service Pvt. Ltd.

Q1.

- a. $A \odot B$
- b. AB
- c. $A+B$
- d. $A \oplus B$

$$\begin{aligned} ((A+B)' + (A' + B')')' &= (A+B) \cdot (A'+B') \\ &= AB' + A'B = A \oplus B \end{aligned}$$

What does the following circuit yield to ?



Q2.

Which of the options is correct, with respect to the given statements?

- I) Ex-OR obeys commutative law
 - II) Ex-OR obeys Associative law
 - III) Ex-OR is distributive over AND
 - IV) Ex-OR is not distributive over OR
- a. I is False
 - b. II and III are False
 - c. III is False
 - d. III and IV are False

Q3.

Number of 4×1 MUXes used in level 3 to construct a 256×1 MUX is _____, where the number of MUXes used gets reduced from level 1 to level k.

- a. 1
- b. 2
- c. 4
- d. 8

Q4.

What is the correction used in BCD addition if the sum falls in invalid zone?

- a. 3
- b. 6
- c. 10
- d. No Correction

Q5.

Number of levels needed to construct a 16×256 decoder using 2×4 decoder

Q6.

$\Sigma(0,2,5,7,8,10,12,14,15) = F(W, X, Y, Z)$ the number of Essential prime implicants (EPI)?

Q7.

The equivalent in decimal for the Excess-3 code 736?

Q8.

A register contains 2's complement number 10100. The register value is divided by 2 then the value at the o/p of register in decimal is?

Q9.

$F = AB'C'D + A'BCD + AB'CD + ABC'D + AB'C'D'$ the minimum number of gates required for this function?

Q10.

The number of maxterms present in canonical POS (product of sum) of Boolean function

$F(A, B, C) = A + B'C$ is _____ ?

Q11.

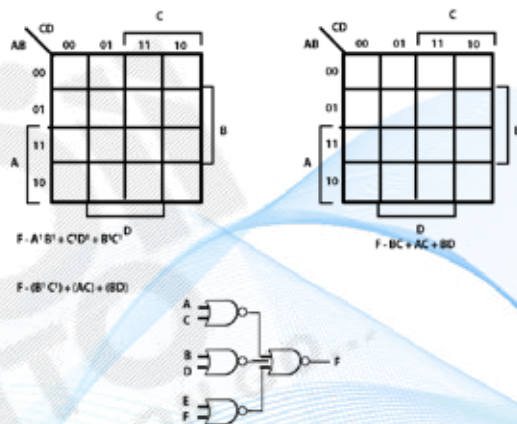
The octal equivalent of largest binary number with 11 bits?

Q12.

In a 4-bit parallel binary adder, a full adder takes 20ns to produce sum and 14ns to produce the carry then time require for addition.....

Q13.

Number of NAND Gates required to implement the complement of given function: $F(A,B,C,D) = (0,1,2,3,4,8,9,12)$



Q14.

An Ex-NOR gate with 5 variables is as follows $Y = A \oplus B \oplus C \oplus D \oplus E$.

The number of minterms in the Boolean expression is.....?

Q15.

Given: three inputs x, y and z and three outputs A, B and C. When the binary input is 0, 1, 2, or 3, the binary output is two greater than the input.

When the binary input is 4, 5, 6, or 7, the binary output is three less than the input, find out the total number of minterms in all 3 outputs A, B, and C.

XYZ	ABC
000	010
001	011
010	100
011	101
100	001
101	010
110	011
111	100

Q16.

Which of the given statements is/are true?

- a. All neutral functions are self-dual.
- b. All self-dual functions are neutral.
- c. A neutral function need should be self-dual.
- d. A self-dual function need not be neutral

Q17.

What is binary representation of (146.6953125)?

- a. 10010010.101100101.....
- b. 10010010.1001101
- c. 10010010.100110101.....
- d. 10010010.1011001

Q18.

What is the correction used in BCD addition if the sum falls in invalid zone?

- a. 3
- b. 6
- c. 10
- d. No Correction

Q19.

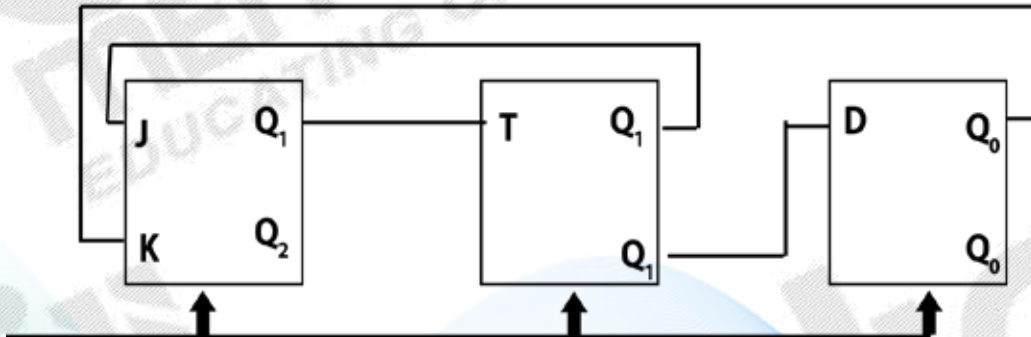
Which combination of circuits is enough to construct a Full Adder?

- a. 2 Half adders, 1 AND gate
- b. 2 Half adders, 1 ExNOR gate
- c. 2 Half adders, 1 ExOR gate
- d. 2 Half adders, 1 OR gate

Q20.

- a. 010
- b. 100
- c. 111
- d. 001

CONSIDER THE FOLLOWING CIRCUIT



Q21.

- a. $w'x+xz+xy'$
- b. $w'x+xz+wz+xy$
- c. $w'x+xy'+wz$
- d. $w'x+wz+xz$

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

Q22.

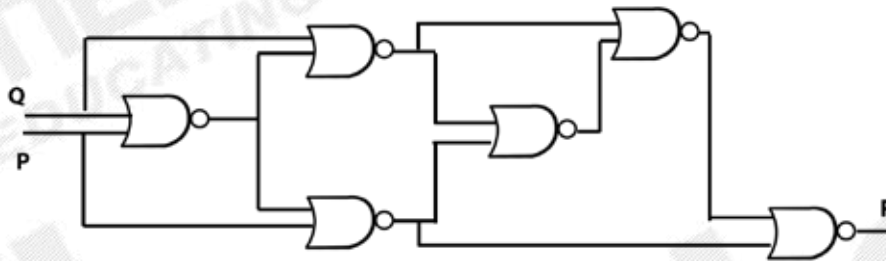
If $646 + 719 = 1264$, then $635 - 171 = \underline{\hspace{2cm}}$.

- a. 646
- b. 719
- c. 474
- d. 464

Q23.

- a. P
- b. Q
- c. 1
- d. 0

What is the output of the given circuit if input has a property that $P > Q$.



Q24.

Which of the given options doesn't represent Exclusive OR

- a. $X \odot Y$
- b. $X' \odot Y'$
- c. $X \oplus Y'$
- d. $(X \oplus Y)'$

Q25.

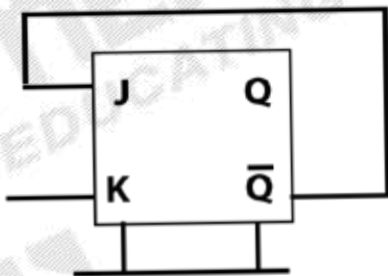
Consider the following floating point number presented in IEEE single precision (32 bits)

as 01101011101101010000000000000000. Determine the sign σ , exponent e , and significand/mantissa x^- and determine the value of $x = \sigma \cdot x^- \cdot 2^e$.

- a. $+(1.4140625) \cdot 2^{88}$
- b. $-(1.4140625) \cdot 2^{88}$
- c. $+(1.4140) \cdot 2^{80}$
- d. None

Q26.

- a. Q'
- b. Q
- c. 0
- d. 1



Q27.

$$(A3F)_{16} + (7BB)_{16} = (x)_{16}, x=?$$

- a. 11BC
- b. 11FA
- c. 11FB
- d. 11EC

Q28.

The output of a 2-bit comparator is logic "1" whenever the 2 bit input A is equal to the 2 bit input B. The no of combinations for true. The output is logic "1" is

- a. 4
- b. 8
- c. 15
- d. None

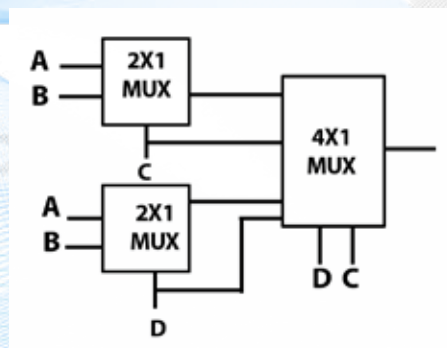
Q29.

In 4 bit Johnson counter initial value 1111. The count sequence of this counter?

- a. 15,7,3,1,8,12,14, 0
- b. 15,7,3,1,0,8,12,14
- c. 15, 14, 12, 8, 0, 1,3,7
- d. 15, 14, 12, 8, 1,3, 7, 0

Q30.

- a. $AD' + BD + C$
- b. $A'D + BD + C$
- c. $AD'C' + BDC' + C$
- d. None of these



Q31.

For a n-to-m line decoder which is true?

- a. $m < 2n$
- b. $m > 2n$
- c. $m \leq 2n$
- d. $m \geq 2^n$

Q32.

The solutions to the quadratic equation $x^2 - 11x + 22 = 0$ are $x = 3$ and $x = 6$. What is the base of the numbers?

- a. 7
- b. 8
- c. 9
- d. None of these

Q33.

Which of the following statement is Incorrect for the range of n bits binary numbers?

- a. Range of Unsigned numbers is 0 to $2^{(n-1)}$
- b. Range of signed numbers $-2^{(n-1)} + 1$ to $2^{(n-1)} - 1$
- c. Range of signed 1's complement numbers $-2^{(n-1)}$ to $2^{(n-1)} - 1$
- d. Range of signed 2's complement numbers $-2^{(n-1)}$ to $2^{(n-1)} - 1$

Q34.

Find the minterms of the following Boolean expressions
 $F1(x, y, z) = xy + yz + xy'z$ and $F2(A, B, C, D) = C'D + ABC' + ABD' + A'B'D$
respectively,

- a. 4, 8
- b. 5, 8
- c. 4, 7
- d. 5, 9

Q35.

Which of the following statements is/are TRUE?

- I. In N to M Multiplexer $M = \log_2(N)$
 - II. For multiplexer, number of input lines greater than number of output lines
- a. I is true
 - b. II is true
 - c. Both are true
 - d. None of these

Q36.

Which of the following statements is/are TRUE?

- I. Dual of Ex-OR is also its complement.
 - II. 4 NAND gates are required to implement EX-OR gate.
 - III. Number of Boolean functions formed over for n-n valued variables = $(2^2)^n$
- a. II and III are true
 - b. I and II are true
 - c. All are true
 - d. I and III are true

Q37.

Sum of Self-complementary code is?

- a. 8
- b. 9
- c. 15
- d. 10

Q38.

Number of input conditions that will produce low output in an N input NAND Gate is?

- a. $2^N - 1$
- b. 1
- c. $2^N - N$
- d. N

Q39.

How many natural states will there be in a 4-bit ripple counter?

- a. 4
- b. 8
- c. 16
- d. 32

Q40.

The Q-output of J-K flip-flop is 1. The output does not change when a clock pulse is applied. The input J and K will be respectively (x- don't care state)

- a. 0 and x
- b. 0 and 1
- c. 1 and 0
- d. x and 0