GATE

PRACTICE SHEET 01

CS & IT

Digital Logic

Boolean theorem and Gates

Q1 $(A+B)(A+C)(A+\overline{C})$ is equivalent to
(A) A + BC
(B) $A+B\overline{C}$
(C) 0
(D) A

Q2 A logical function is given as:
$f(A,B,C) = B\overline{C}[A + A\overline{C}D + \overline{B}CD + \overline{A}B\overline{C} + \overline{ABC}]$
is equivalent to
(A) $A\overline{B}\,CD$
(B) $B\overline{C}$
(C) $A\overline{B} + B\overline{C} + CD$
(D) $AB\,\overline{C}D$

Q3 If we have 4-variables in a logical function, then number of non-dual logical functions possible_____.

Q4 A logical function
f*(*A*, *B*, *C*)** = (A*** + ***B***) $(\overline{B}+C)(A+C)$, then $\bar{f}$ will be equal to
(A) $AB + \overline{B}C$
(B) $\overline{A}\overline{B} + B\overline{C}$
(C) $\overline{A}\overline{B} + \overline{A}\overline{C}$
(D) $AB + AC$

Q5 Which of the following statement is true?
(A) Dual function f^D is always equals to ***f***.
(B) NAND is self dual in nature.
(C) NOT is self dual in nature.
(D) Number of self dual function with 3-variables is ***8***.

Q6 Logical function ***f*(*A*, *B*, *C*, *D*)** = $AB + \overline{A}CD + \overline{B}\,CD$ is equivalent to
(A) $AB + \overline{B}C$
(B) AB + CD
(C) $\overline{A}C + \overline{B}C$
(D) $AB + \overline{B}C$

Q7 A logical function is given as:
f(A, B, C) = $\overline{A}\overline{B} + \overline{A}BC + \overline{A}B\overline{C}$
then which of the following statement is true?
(A) f(A, B, C) = $\overline{A}\overline{B} + B\overline{C}$
(B) $f(A,\ B,\ C) = \overline{A} + \overline{C}$
(C) $f(A,\ B,\ C)$ is a self dual function.
(D) None of the above

Q8 Which of the following is true?
(A) $\overline{\overline{AB} + A\overline{B}} = (\overline{A}+\overline{B})(A+B)$
(B) $\overline{AB\,\overline{CD}} = \overline{A} + \overline{B} + \overline{C} + \overline{D}$
(C) $\overline{\overline{A\overline{B}}.C} = (A+\overline{C})(\overline{B}+\overline{C})$
(D) None of these

Q9 Which of the following is true?
(A) We can use '1' as enable input for OR gate
(B) We can use '0' as enable input for AND gate
(C) '0' as well as '1' can be used as enable input for XNOR gate
(D) None of the these

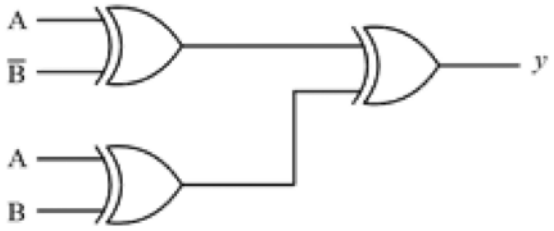
Q10 Which of the following relation is true?
(A) $A \oplus \overline{B} = \overline{A} \odot B$
(B) $\overline{A \oplus \overline{B}} = A \odot B$

GATE

(C) $\overline{\overline{A} \odot \overline{B}} = A \oplus B$

(D) $\overline{\overline{A} \oplus \overline{B}} = A \oplus B$

Q11 A logical circuit is as given below:



Output ***y*** will be

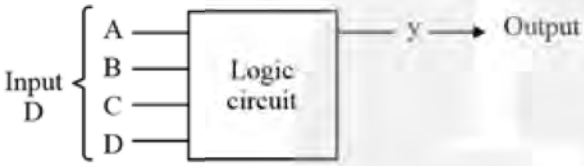
(A) $\overline{A} + B$

(B) $\overline{A} + \overline{B}$

(C) $A\overline{B}$

(D) A + B

Q12 A logic circuit has 4-input & 1-output line as shown:



Output ***y*** is '1' wherever no. of zeroes on input side are odd, then output y can be expressed as:

(A) $A \odot B \odot C \odot D$

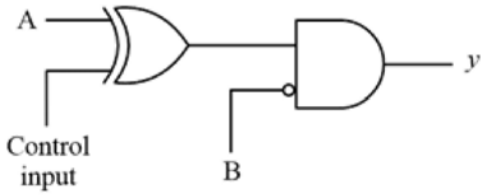
(B) $\overline{A \odot B \odot C} \odot D$

(C) $\overline{A \oplus B} \oplus C \oplus \overline{D}$

(D) None of these

Q13 A logic circuit is as given below:

Which of the following is true?



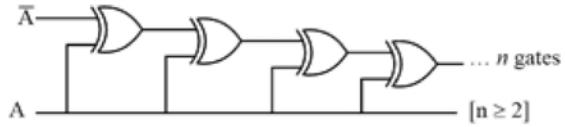
(A) Output ***y*** is $\overline{A}B$ if control input = 0

(B) Output ***y*** is $\overline{A + B}$ if control input = 1

(C) Output ***y*** is $\overline{A \cdot B}$ if control input = 0

(D) Output ***y*** is $\overline{\overline{A} \cdot B}$ if control input = 1

Q14 A logic circuit is as given below:



Which of the following is true?

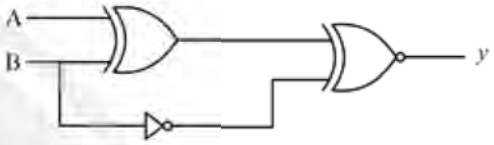
(A) Output is $\overline{A}$ if n is even

(B) Output is A if n is even

(C) Output is $\overline{A}$ if n is odd

(D) Output is A if n is odd

Q15 A logical circuit is as given below:



Output ***y*** is

(A) A (B) $\overline{B}$

(C) $\overline{A}$ (D) B

Q16 A logical expression is given as:

$f(A, B, C, D) = \overline{A} + AB[ABC + \overline{B}C + AB\overline{C} + C\overline{D}]$

then minimum number of 2-input NAND gate require to implement above logic function will be _____ .

Q17 A logical expression is given as:

$f(A, B, C) = (\overline{A} + B)(A + \overline{B})$,

minimum number of 2-input NAND gate require to implement above logical function is .

Q18 A logical expression is given as:

$f(A, B, C) = \overline{A} + ABC$, then minimum number of 2-input NAND gate require to implement above logical function is _____ .

Q19 A logical function is given as:

GATE

$f(A, B) = A \oplus A\overline{B}$, If we implement this logical function using 2-input NAND gate then, minimum number of NAND gate require is

GATE

Answer Key

Q1	(D)
Q2	(B)
Q3	65280~65280
Q4	(B)
Q5	(C)
Q6	(B)
Q7	(C)
Q8	(C)
Q9	(C)
Q10	(C)
Q11	(B)
Q12	(B, C)
Q13	(B)
Q14	(A)
Q15	(A)
Q16	2~2
Q17	5~5
Q18	2~2
Q19	2

GATE

Hints & Solutions

Q1 Text Solution:
(d)

Q2 Text Solution:
(b)

Q3 Text Solution:
(65280)

Q4 Text Solution:
(b)

Q5 Text Solution:
(c)

Q6 Text Solution:
(b)

Q7 Text Solution:
(c)

Q8 Text Solution:
(c)

Q9 Text Solution:
(c)

Q10 Text Solution:
(c)

Q11 Text Solution:
(b)

Q12 Text Solution:
(b, c)

Q13 Text Solution:
(b)

Q14 Text Solution:
(a)

Q15 Text Solution:
(a)

Q16 Text Solution:
2

Q17 Text Solution:
5

Q18 Text Solution:
2

Q19 Text Solution:
2