QUESTION 13

What is the simplest form of the Boolean function x'y + x'y' + x ?

1. 0
2. 1
3. y' + y
4. x' + x

QUESTION 14

By applying de Morgan's theorem and involution, which of the following expressions represents the same Boolean function as [(A'B) + C] ':

1. (A + B') + C'
2. (AB') + C'
3. (A' + B) · C'
4. (A + B') · C'

QUESTION 15

What is the simplest form of the Boolean function y + x'yz + xyz ?

1. yz
2. 1
3. y(1 + z)
4. y

Rough Work

Rough work:

QUESTION 16

The following question refer to the incomplete truth table below for the expression

G = B' C + AC'

What is the expression G in sum of minterms form?

A	B	C	G	minterms	m-notation
0	0	0	0		m_0
0	0	1	1		m_1
0	1	0	0	A'BC'	M_2
0	1	1	0		m_3
1	0	0	1		M_4
1	0	1	1		M_5
1	1	0	1		M_6
1	1	1	0		M_7

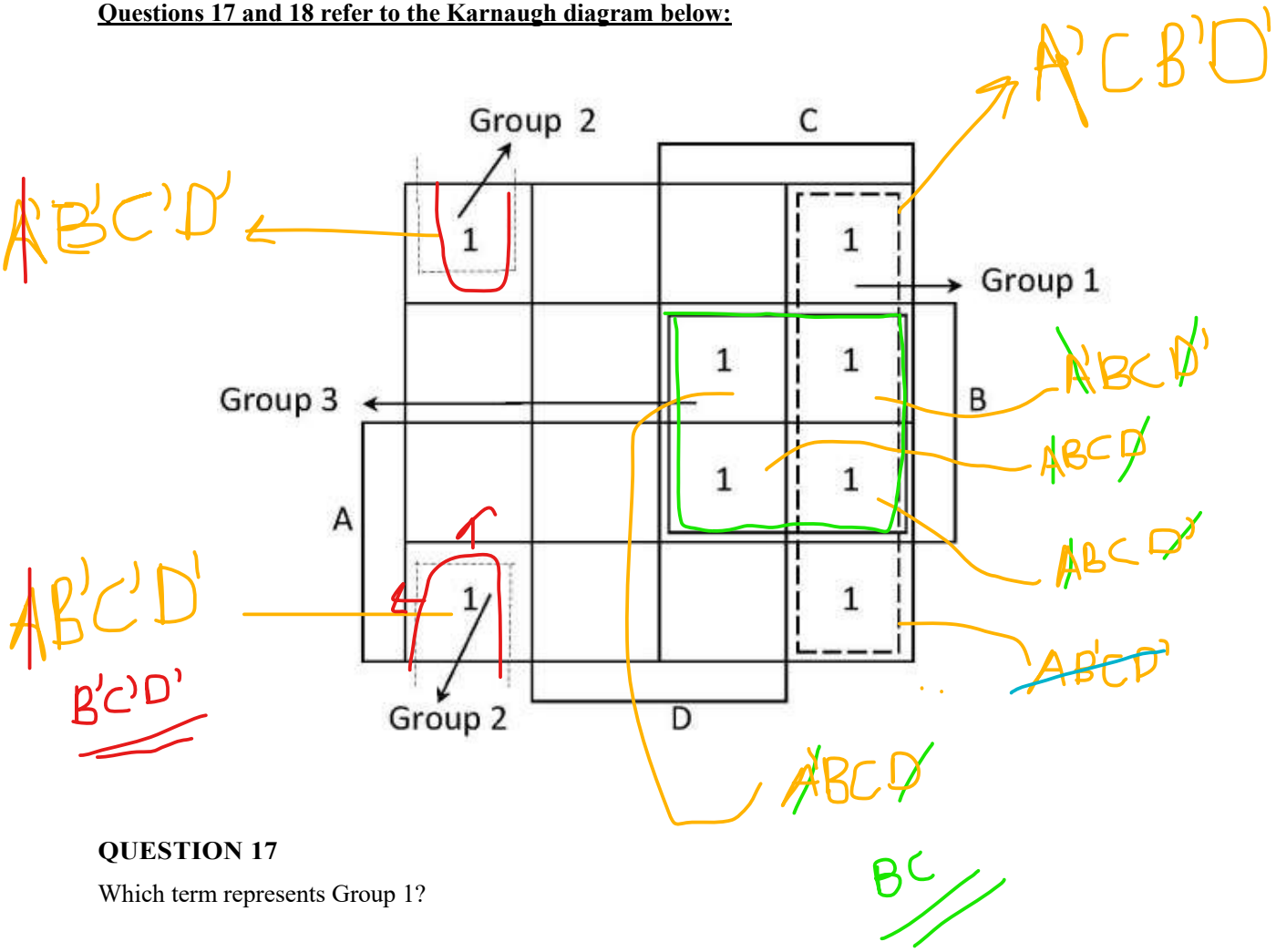
$G = (A + A')B'C + A(B' + B)C'$

$= AB'C + A'B'C + AB'C' + ABC'$

1. $m_5 + m_1 + m_2 + m_0$
2. $m_5 + m_1 + m_6 + m_4$
3. $m_7 + m_3 + m_2 + m_0$
4. $m_7 + m_3 + m_6 + m_4$

Rough work:

Questions 17 and 18 refer to the Karnaugh diagram below:



QUESTION 17

Which term represents Group 1?

1. C
2. D'
3. CD'
4. BCD'

QUESTION 18

Which term represents Group 3?

1. BC
2. BD'
3. AB
4. BCD

QUESTION 19

Which of the Karnaugh diagrams below represents the expression $X = A + BC + AB$?

1.

	B'C'	B'C	BC	BC'
A'	1	1	1	1
A	0	0	1	0

2.

	B'C'	B'C	BC	BC'
A'	0	0	1	1
A	1	1	1	1

3.

	B'C'	B'C	BC	BC'
A'	0	0	1	0
A	0	1	1	1

4.

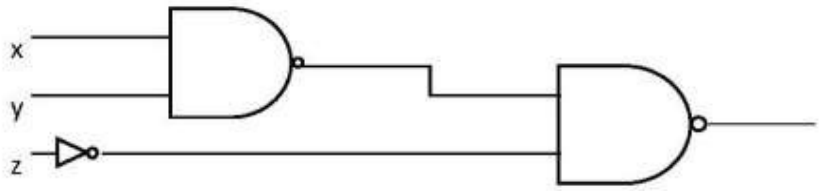
	B'C'	B'C	BC	BC'
A'	0	0	1	0
A	1	1	1	1

Rough work:

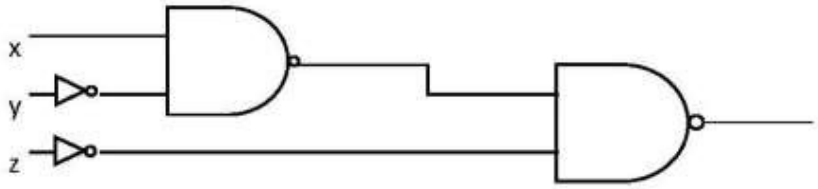
QUESTION 20

Which logic diagram presents the logic expression ((x · y') · z')' ?

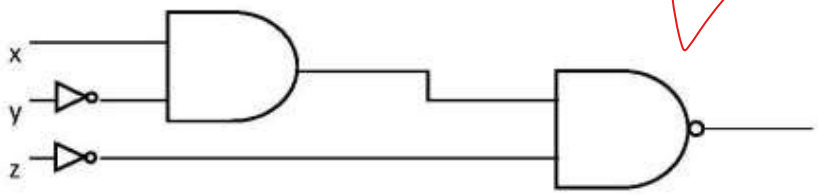
1.



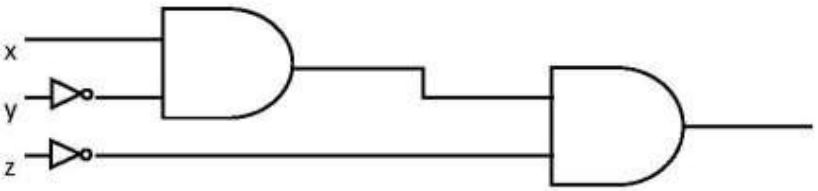
2.



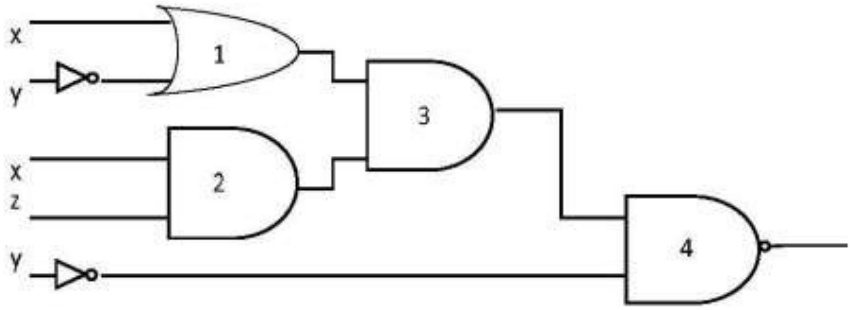
3.



4.



Questions 21, 22 and 23 refer to the following combinational logic circuit:



((x + y') · (x · z)) · y'

QUESTION 21
Gate 4 is an example of a _____ gate.

1. AND
2. NAND
3. NOR
4. OR

QUESTION 22
What is the output of Gate 3?

1. (x + y') · (x · z)
2. (x · y') · (x · z)
3. (x + y') + (x · z)
4. (x · y') + (x · z)

QUESTION 23
What is the output of Gate 4?

1. [((x · y') + (x · z)) · y'] '
2. [((x + y') + (x · z)) · y'] '
3. [((x · y') · (x · z)) · y'] '
4. [((x + y') · (x · z)) · y'] '

Rough work:

Questions 24, 25, 26 and 27 refer to the following scenario:

A group of students are allowed to have a food stall at the upcoming soccer event at the university, only if they sell all of the following items at their stall:

1. Pancakes
2. Hamburgers
3. Pizzas
4. Chips

Student A can make items 1 and 2. Student B can make items 3 and 4. Student C can make items 2 and 4, and student D can make items 1 and 3.

A Boolean function F(A,B,C,D) is defined as follows: F(A,B,C,D) = 1 when all 4 items are available (and the food stall is therefore allowed) and F(A,B,C,D) = 0 when all 4 items are not available (and therefore the food stall is not allowed).

Different combinations inputs for A, B, C and D are given in the tables provided in the following FOUR questions. Which alternative shows the correct outputs for F in EACH of the following FOUR questions?

QUESTION 24

				Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**D**	**F**	**F**	**F**	**F**
1	0	0	0	1	0	0	1
0	1	1	0	0	0	1	1

QUESTION 25

				Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**D**	**F**	**F**	**F**	**F**
0	0	1	1	1	0	0	1
1	1	0	0	0	0	1	1

QUESTION 26

				Alternative 1	Alternative 2	Alternative 3	Alternative 4
A	**B**	**C**	**D**	**F**	**F**	**F**	**F**
1	1	0	0	1	0	0	1
0	0	0	1	0	0	1	1