



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

LOGIKASTESELS N4

13 April 2026

Hierdie nasienriglyn bestaan uit 8 bladsye.

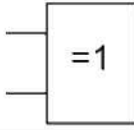
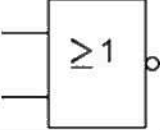
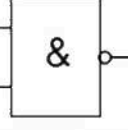
VRAAG 1

1.1 10 (1)

1.2 1.2.1 Waar
1.2.2 Onwaar
1.2.3 Onwaar
1.2.4 Onwaar
1.2.5 Waar

(5 × 1) (5)

1.3

TOEVOER		AFVOER		
A	B			
1	0	1	0	1
0	0	0	1	1
1	1	0	0	0
0	1	1	0	1
		✓	✓	✓

(3)

1.4 1.4.1 $\bar{A} + B$
1.4.2 $A(A + B)$
1.4.3 ABD

(3 × 1) (3)

1.5 Sinchroon, ✓ want al die wipkringe is gelyktydig geklok. In 'n asinchrone stelsel is die wipkringe in serie geklok. ✓ (2)

1.6 1.6.1

	00	01	11	10
00	1	0	0	0
01	1	0	0	1
11	0	0	0	0
10	1	1	1	1

$F = A + \bar{B} + \bar{D}$ ✓

1.6.2

	00	01	11	10
00	1	1	1	1
01	1	1	1	1
11	0	0	0	1
10	1	1	1	1

$F = \bar{B} + \bar{C} + \bar{D}$ ✓

1.6.3

	00	01	11	10
00	1	1	∅	∅
01	1	0	0	0
11	1	1	∅	∅
10	1	1	0	0

✓

$$F = \bar{A}\bar{D} + \bar{A}\bar{B} + \bar{A}C \quad \checkmark$$

(3 × 2)

(6)
[20]

VRAAG 2

2.1 2.1.1

$$67,4_8 = 110111,100_2$$

$$3C,8_{10} = 00111100,1000_2$$

$$\begin{array}{r}
 1 \ 1 \ 0 \ 1 \ 1 \ 1, \ 1 \ 0 \ 0 \ \checkmark \\
 1 \ 1 \ 1 \ 1 \ 0 \ 0, \ 1 \ 0 \ 0 \ \checkmark \\
 \hline
 0 \ 0 \ 0 \ 0 \ 1 \ 1, \ 0 \ 1 \ 1 \\
 + 1 \\
 \hline
 0 \ 0 \ 0 \ 0 \ 1 \ 1, \ 1 \ 0 \ 0 \ \checkmark \\
 + \ 1 \ 1 \ 0 \ 1 \ 1 \ 1, \ 1 \ 0 \ 0 \\
 \hline
 1 \ 1 \ 1 \ 0 \ 1 \ 1, \ 0 \ 0 \ 0 \ \checkmark \\
 \hline
 0 \ 0 \ 0 \ 1 \ 0 \ 0, \ 1 \ 1 \ 1 \\
 + 1 \\
 \hline
 0 \ 0 \ 0 \ 1 \ 0 \ 1, \ 0 \ 0 \ 0 \ \checkmark
 \end{array}$$

$$= -5_{10} \quad \checkmark$$

(6)

2.1.2

$$35,25_{10} = 100011,01_2$$

$$14,5_{10} = 1110,1_2$$

$$\begin{array}{r}
 1 \ 0 \ 0 \ 0 \ 1 \ 1, \ 0 \ 1 \ \checkmark \\
 1 \ 1 \ 1 \ 0, \ 1 \ 0 \ \checkmark \\
 \hline
 1 \ 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 0 \ 1 \ 0 \ \checkmark \\
 1 \ 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 0 \ 0 \ 0 \\
 1 \ 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 0 \ 0 \ 0 \ 0 \\
 + \ 1 \ 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 0 \ 0 \ 0 \ 0 \ 0 \ \checkmark \\
 \hline
 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1 \ 1, \ 0 \ 0 \ 1 \ 0 \ \checkmark
 \end{array}$$

$$= 511,125_{10} \quad \checkmark$$

(6)

2.1.3 $147,5_{10} = 10010011,1_2$
 $2,3_8 = 10,011_2$

$$\begin{array}{r}
 \begin{array}{cccccccc}
 & 1 & 0 & 0 & 1 & 1 & 1 & 1 \\
 100 & \overline{1} & 0 & 0 & 1 & 1 & 1 & 0,1 \\
 - & 1 & 0 & 0 & & & & \\
 \hline
 & & & 1 & 1 & 1 & & \\
 & & & 1 & 0 & 0 & & \\
 \hline
 & & & & 1 & 1 & 0 & \\
 - & & & & 1 & 0 & 0 & \\
 \hline
 & & & & & 1 & 0 & 1 \\
 - & & & & & 1 & 0 & 0 \\
 \hline
 & & & & & & 1 & \\
 \hline
 & & & & & & & 1
 \end{array}
 \end{array}$$

$= 23,4_8$ ✓

(6)

2.2 American Standard Code for Information Interchange

(2)

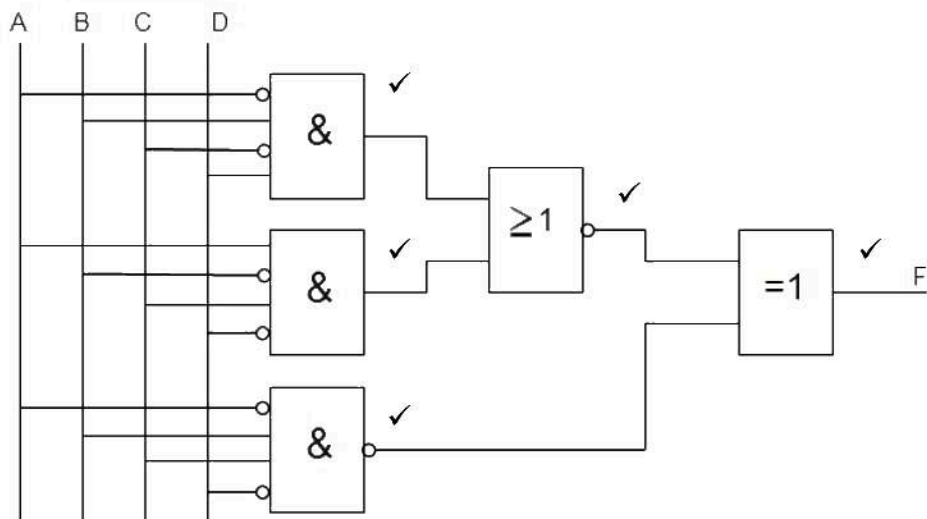
2.3 5 - 011 0101 ✓
x - 111 1000 ✓
+ - 010 1011 ✓
- 010 0011 ✓
= - 011 1101 ✓

(5)

[25]

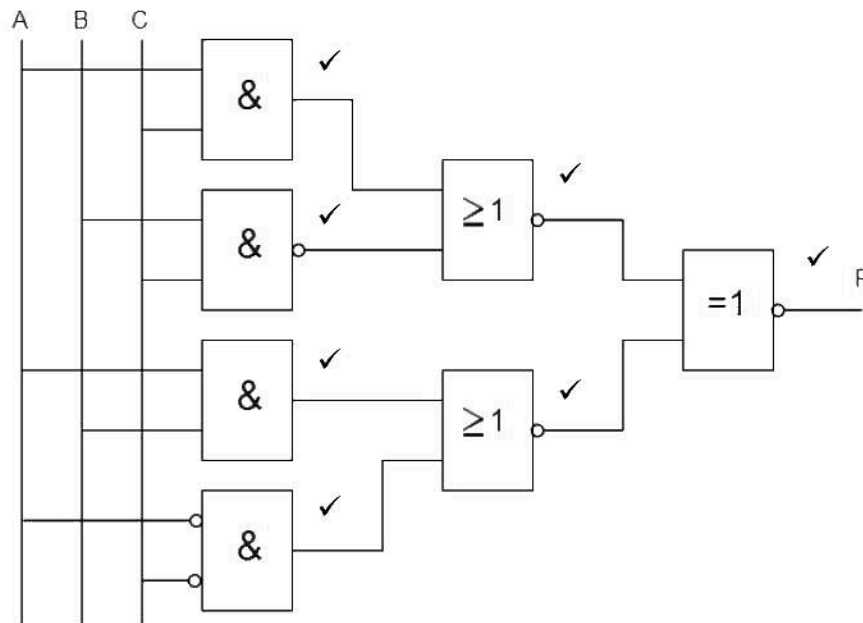
VRAAG 3

3.1 3.1.1



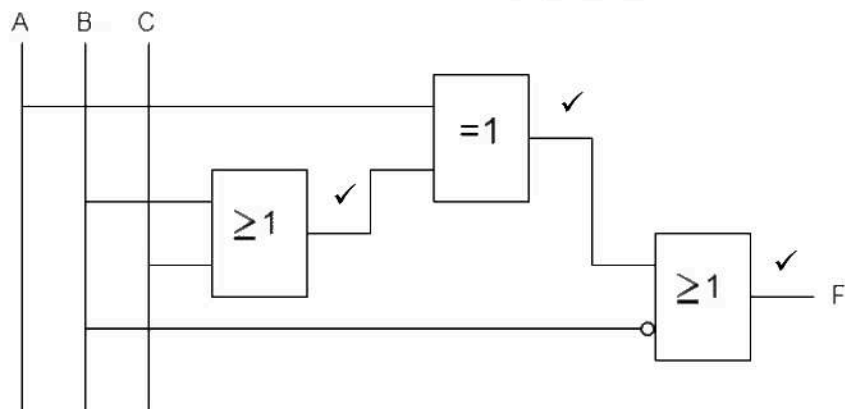
(5)

3.1.2



(7)

3.1.3

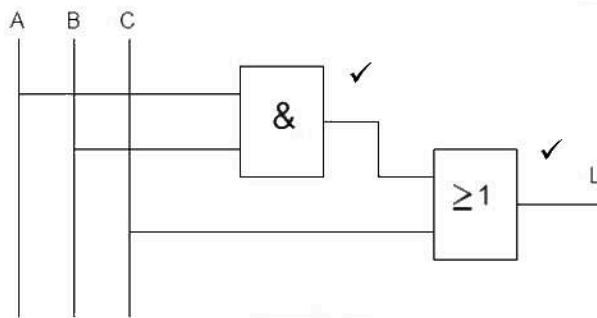


(3)

3.2

A	B	C	L	
0	0	0	0	
0	0	1	1	✓
0	1	0	0	
0	1	1	1	✓
1	0	0	0	
1	0	1	1	✓
1	1	0	1	
1	1	1	1	✓

$$\begin{aligned}
 L &= \bar{A}\bar{B}C + \bar{A}BC + A\bar{B}C + AB\bar{C} + ABC \quad \checkmark \\
 &= \bar{A}C(\bar{B} + B) + A\bar{B}C + AB(\bar{C} + C) \\
 &= \bar{A}C + A\bar{B}C + AB \quad \checkmark \\
 &= C(\bar{A} + A\bar{B}) + AB \\
 &= C(\overline{A\bar{B}}) + AB \quad \checkmark \\
 &= C + AB \quad \checkmark
 \end{aligned}$$



(10)
[25]

VRAAG 4

Toevoere (8421 BCD)				Afvoere (Gray)			
A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	1
0	0	1	1	0	0	1	0
0	1	0	0	0	1	1	0
0	1	0	1	0	1	1	1
0	1	1	0	0	1	0	1
0	1	1	1	0	1	0	0
1	0	0	0	1	1	0	0
1	0	0	1	1	1	0	1
1	0	1	0	1	1	1	1
1	0	1	1	1	1	1	0
1	1	0	0	1	0	1	0
1	1	0	1	1	0	1	1
1	1	1	0	1	0	0	1
1	1	1	1	1	0	0	0
				✓	✓	✓	✓

(Kandidate moet die Karnaugh-kaart en korrekte vereenvoudiging toon om 1 punt te kry. Gee 'n halfpunt as die Karnaugh-kaart korrek maar die vereenvoudiging foutief is.)

	00	01	11	10
00			1	1
01			1	1
11			1	1
10			1	1

$$W = A \quad \checkmark$$

	00	01	11	10
00		1		1
01		1		1
11		1		1
10		1		1

$$X = \bar{A}B + A\bar{B} \quad \checkmark = A \oplus B \quad \checkmark$$

	00	01	11	10
00		1	1	
01		1	1	
11	1			1
10	1			1

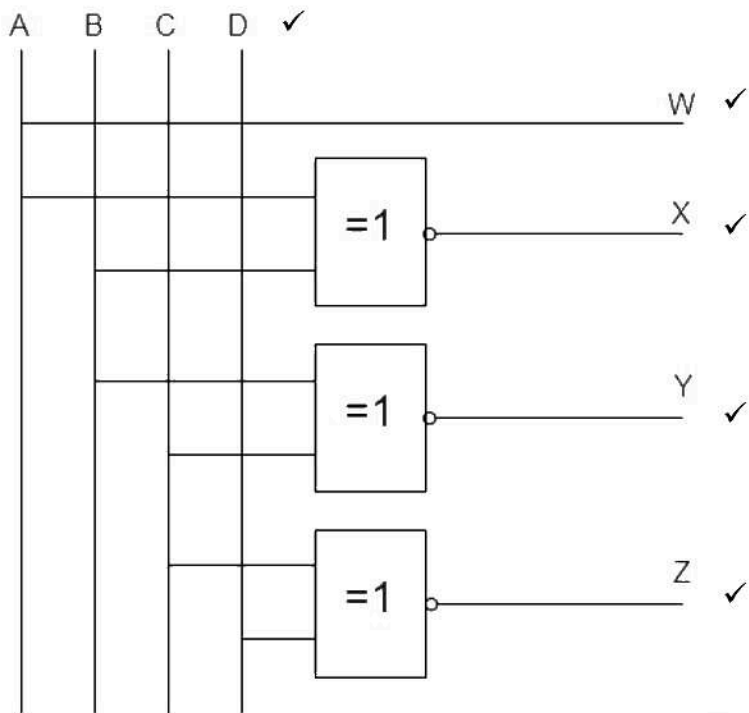
$$Y = B\bar{C} + \bar{B}C \quad \checkmark$$

$$= B \oplus C \quad \checkmark$$

	00	01	11	10
00				
01	1	1	1	1
11				
10	1	1	1	1

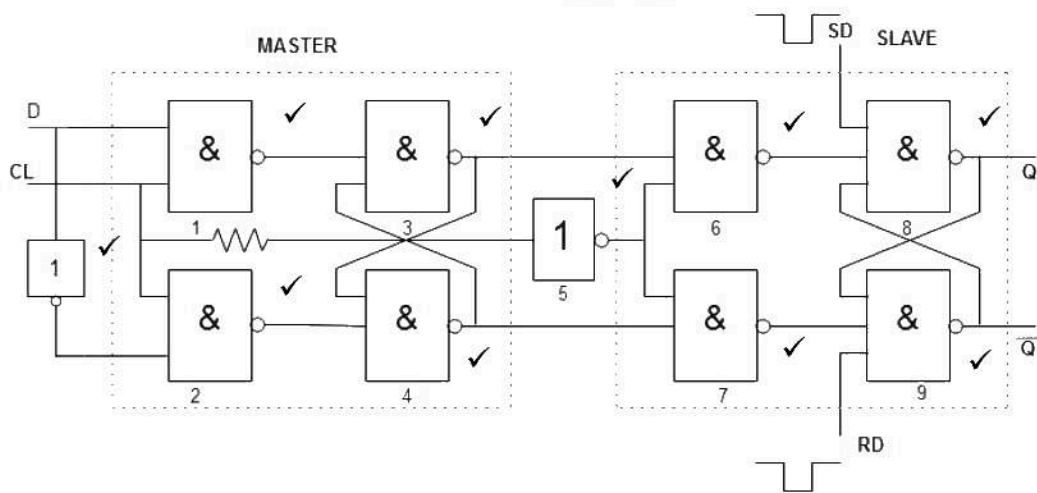
$$Z = \bar{C}D + C\bar{D} \quad \checkmark$$

$$= C \oplus D \quad \checkmark$$



[20]

VRAAG 5



[10]

TOTAAL: 100