



higher education
& training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NATIONALE SERTIFIKAAT

LOGIKASTELSLS N3

16 April 2021

Hierdie nasienriglyn bestaan uit 7 bladsye.

VRAAG 1: GETALLESTEELSELS

1.1 $FA,2_{16} + 7,6_8 + 1111,1011_2$

$$FA,2_{16} = 11111010,0010_2 \quad \checkmark$$

$$7,6_8 = 111,110_2 \quad \checkmark$$

$$\begin{array}{r} 11111010,0010 \quad \checkmark \\ 00000111,1100 \quad \checkmark \\ + 00001111,1011 \\ \hline 100010001,1001 \checkmark \end{array}$$

$$100010001,1001_2 = 111,9_{16} \checkmark$$

(4)

1.2 $34,1_8 \times 12,5_{10}$

$$34,1_8 = 011100,001_2 \quad \checkmark$$

$$12,5_{10} = 1100,1_2 \quad \checkmark$$

$$\begin{array}{r} 11100,001 \\ \times 1100,100 \\ \hline 1110000100 \quad \checkmark \\ 1110000100000 \\ + 11100001000000 \quad \checkmark \\ \hline 101011111,100100 \quad \checkmark \end{array}$$

$$101011111,100100_2 = 537,44_8 \checkmark$$

(5)

1.3 $26,6_8 = 010110,110_2 \quad \checkmark$
 $1A,C_{16} = 00011010,1100_2 \quad \checkmark$

$$\begin{array}{r}
 10110,1100 \longrightarrow 10110,1100 \\
 - 11010,1100 \longrightarrow 00101,0011 \text{ (1's c)} \\
 \hline
 + 1 \\
 \hline
 00101,0100 \text{ (2's c)} \quad \checkmark
 \end{array}$$

$$\begin{array}{r}
 10110,1100 \\
 + 00101,0100 \\
 \hline
 11100,0000 \quad \checkmark
 \end{array}$$

$$\begin{array}{r}
 00011,1111 \\
 + 1 \\
 \hline
 - 00100,0000 \quad \checkmark
 \end{array}$$

$$- 100_2 = - 4_{10} \quad \checkmark$$

(5)

1.4 $4B,6_{16} \div 4,5_{10}$

$$4B,6_{16} = 01001011,0110_2 \quad \checkmark$$

$$4,5_{10} = 100,1_2 \quad \checkmark$$

$$\begin{array}{r}
 10000,11 \quad \checkmark \\
 1001 \overline{) 10010110,110} \\
 \underline{-1001} \quad \checkmark \\
 01101 \\
 \underline{-1001} \quad \checkmark \\
 1001 \\
 \underline{-1001} \quad \checkmark
 \end{array}$$

$$10000,11_2 = 16,75_{10} \quad \checkmark$$

(6)
[20]

VRAAG 2: KODES, DATA EN DATAKOMMUNIKASIE, ENKODEERDERS, DEKODEERDERS EN REKENKUNDIGE ELEMENTE

2.1 Extended Binary Coded Decimal Interchange Code (2)

2.2 **E** 1100 0101 ✓
q 1001 1000 ✓
M 1101 0100 ✓
c 1000 0011 ✓
2 1111 0010 ✓ (5)

2.3 2.3.1 1010 0111 0110
 $= 6 \checkmark 1 \checkmark 2 \checkmark$
 $= 612_{10}$ (3)

2.3.2 101_{10}
 $= 1100101_2 \checkmark$
 $1 + 1 + 0 + 0 + 1 + 0 + 1$ Binary ✓
 $1 \ 0 \ 1 \ 0 \ 1 \ 1 \ 1$ Gray ✓ (3)

2.4 'n 2421 BKD-dekodeerder het 10 leweringslyne omdat dit vanaf 0000(0) tot 1111(9) dekodeer, wat beteken dat dit 10 keer dekodeer. (2)

2.5

P ₁	P ₂	D ₁	P ₃	D ₂	D ₃	D ₄	P ₄	D ₅	D ₆
1	2	3	4	5	6	7	8	9	10
?	?	1	?	0	1	0	?	1	1

1,3,5,7,9	P ₁ + D ₁ + D ₂ + D ₄
	P ₁ + 1 + 0 + 0 + 1
	P ₁ = 0 ✓

2,3,6,7,10	P ₂ + D ₁ + D ₃ + D ₄ + D ₆
	P ₂ + 1 + 1 + 0 + 1
	P ₂ = 1 ✓

4,5,6,7	P ₃ + D ₂ + D ₃ + D ₄
	P ₃ + 0 + 1 + 0
	P ₃ = 1 ✓

8,9,10	P ₄ + D ₅ + D ₆
	P ₄ + 1 + 1
	P ₄ = 0 ✓

Die nuwe woord is 0111010011 ✓

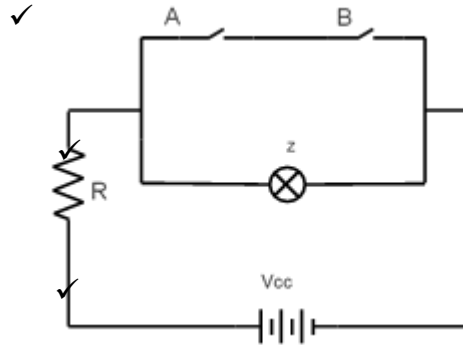
(5)
[20]

VRAAG 3: LOGIKAHEKKE, GEÏNTEGREERDE KRINGE EN LOGIKAFAMILIES

- 3.1 3.1.1 A
 3.1.2 A
 3.1.3 C
 3.1.4 A
 3.1.5 B

(5 × 1) (5)

- 3.2 3.2.1



(3)

- 3.2.2

A	B	Z
0	0	1
0	1	1
1	0	1
1	1	0

(2)

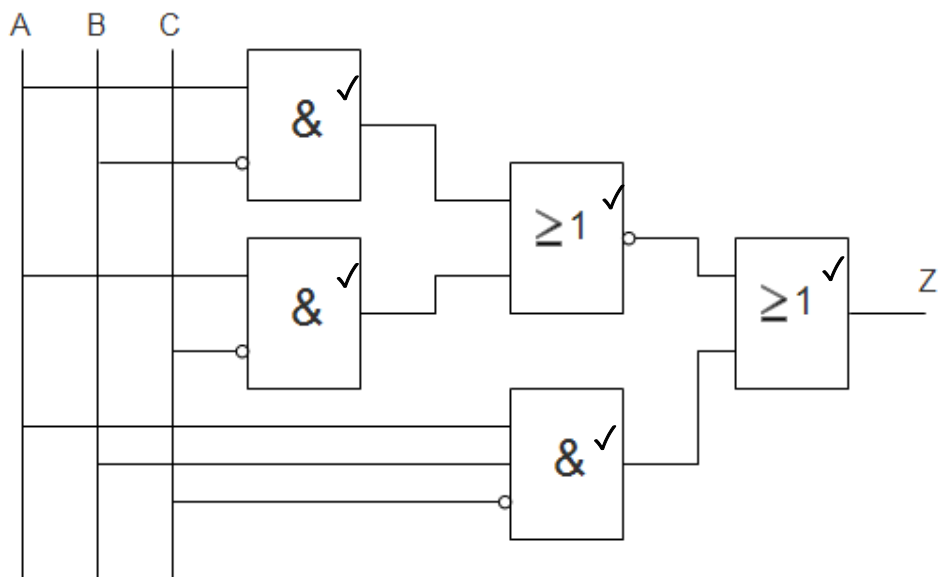
- 3.3

A	B	C	a	b	c	d	Z
0	0	0	1	0	1	0	0
0	0	1	1	0	1	0	0
0	1	0	1	0	1	0	0
0	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0
1	1	0	0	0	0	0	0
1	1	1	0	0	0	0	0

✓ ✓ ✓ ✓ ✓

(5)

3.4

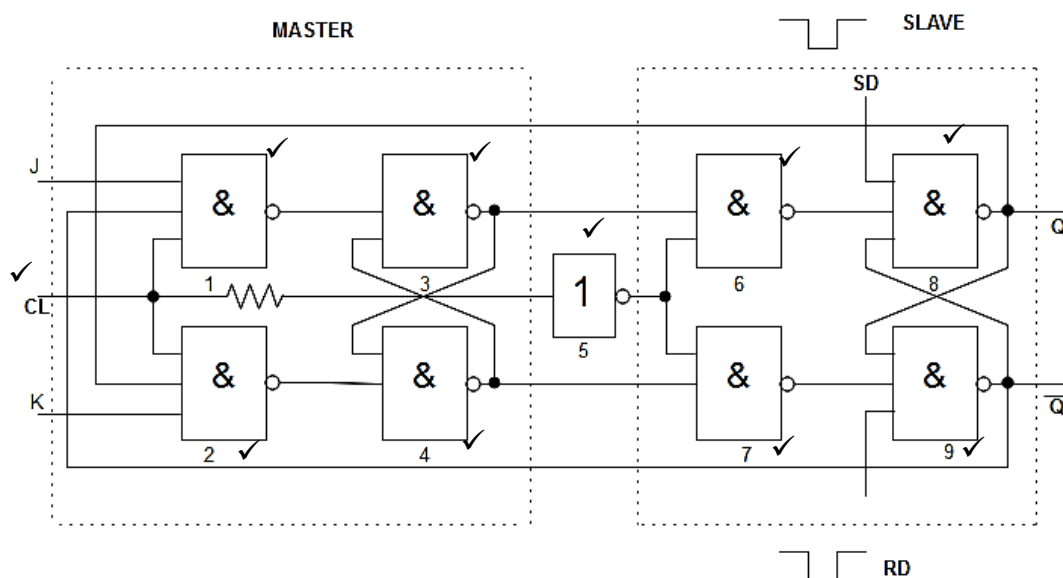


(5)
[20]

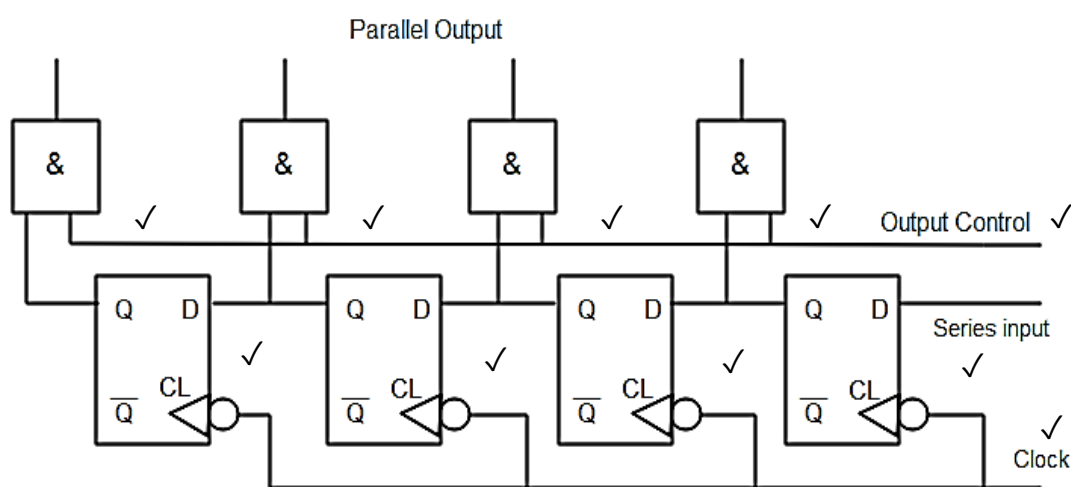
VRAAG 4: GEHEUE-ELEMENTE EN GEHEUES

4.1	4.1.1	Lukrake toegangsgeheue		
	4.1.2	Uitwisbare programmeerbare leesalleengeheue		
	4.1.3	Programmeerbare leesalleengeheue	(3 × 1)	(3)
4.2	4.2.1	J = 1, K = 1		
	4.2.2	J = 0, K = 0		
	4.2.3	J = 1, K = 0		
	4.2.4	J = 0, K = 1	(4 × 1)	(4)
4.3	Wanneer J = 1 en K = 1			(1)
4.4	S-R-wipkring Geklokte S-R-wipkring S-R-meester/slaaf-wipkring		(Enige 2×1)	(2)

4.5

(10)
[20]**VRAAG 5: SKUIFREGISTERS EN TELLERS**

- 5.1 5.1.1 Waar
 5.1.2 Onwaar
 5.1.3 Onwaar
 5.1.4 Waar
 5.1.5 Waar
 5.1.6 Waar (6 × 1) (6)
- 5.2 Die doel van 'n skuifregister is om data tydelik te stoor en om paralleldata na seriedata en omgekeerd om te sit. (2)
- 5.3 Module 3 en module 5-teller (2)
- 5.4

(10)
[20]**TOTAAL: 100**