higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

SYFERELEKTRONIKA N4

29 November 2022

Hierdie nasienriglyn bestaan uit 7 bladsye.

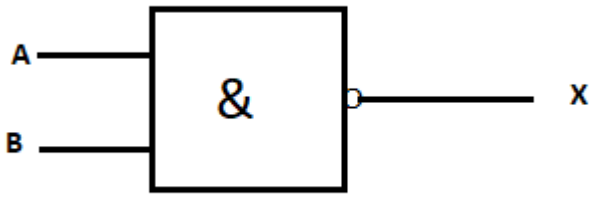
Kopiereg voorbehou

VRAAG 1

1.1 Binêrgekodeerde desimaal (1)

1.2 X-3 BCD (1)

1.3



A	B	Q
0	0	1
0	1	1
1	0	1
1	1	0

$Q = \overline{AB}$ (3)

1.4 1.4.1 X
1.4.2 $\overline{X} + Y$
1.4.3 X
1.4.4 $\overline{X}$
1.4.5 1

(5 × 1) (5)

1.5 In sinchrone skakeling word wipkringe gelyktydig geklok, terwyl in asinchrone skakeling die uitset van een wipkring as die klok van die volgende wipkring dien. (2)

1.6 0111110_{gray} (1)

1.7 Twee gekose lyne (1)

1.8 'n Volopteller het 'n oordraginset en 'n halfopteller het geen oordraginset nie. (2)
[16]

VRAAG 2

2.1 $7,5_8 = 111,101_2$ $0111,101_2$✓
$9,125_{10} = 1001,001_2$ Tweekomplement $\underline{0110,111_2}$✓
$1110,100_2$✓
Geen oordrag kry
tweekomplement $-0001,100_2$ ✓✓

Antwoord = $-1,4_8$✓ (6)

2.2 $12,125_{10} = 1110,001_2$✓
$6,4_8 = 110,100_2$ ✓
10,001✓
110100 $\sqrt{1110001,000}$
1101000
0001001000
0000110100
0000010100✓✓
Antwoord = $10,001_2$
= $2,125_{10}$✓ (6)

2.3 $11,375_{10} = 1011,011_2$✓
$5,2_8 = 101,01_2$✓

1011,011
× 101,01
1011011
101101100
10110110000
111011,10111$_2$ ✓✓✓
Antwoord = $73,56_8$✓ (6)

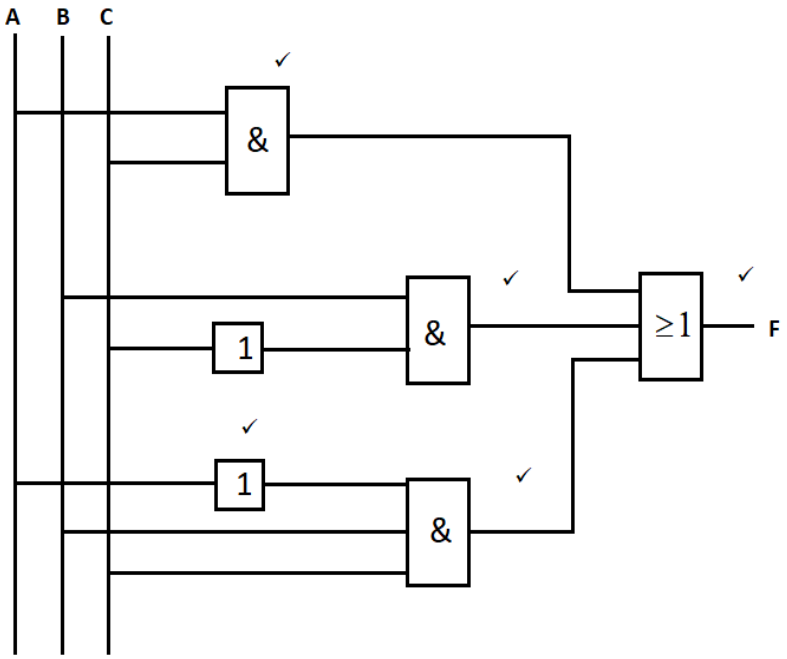
2.4 $-17,25_{10} = 010001,01_2$ eenkomplement 101110,10✓
$14,75_{10} = 001110,11_2$ eenkomplement 110001,00✓

101110,10
110001,00
011111,10
+1
011111,11✓✓
-100000,00✓

Antwoord = -40_8✓ (6)
[24]

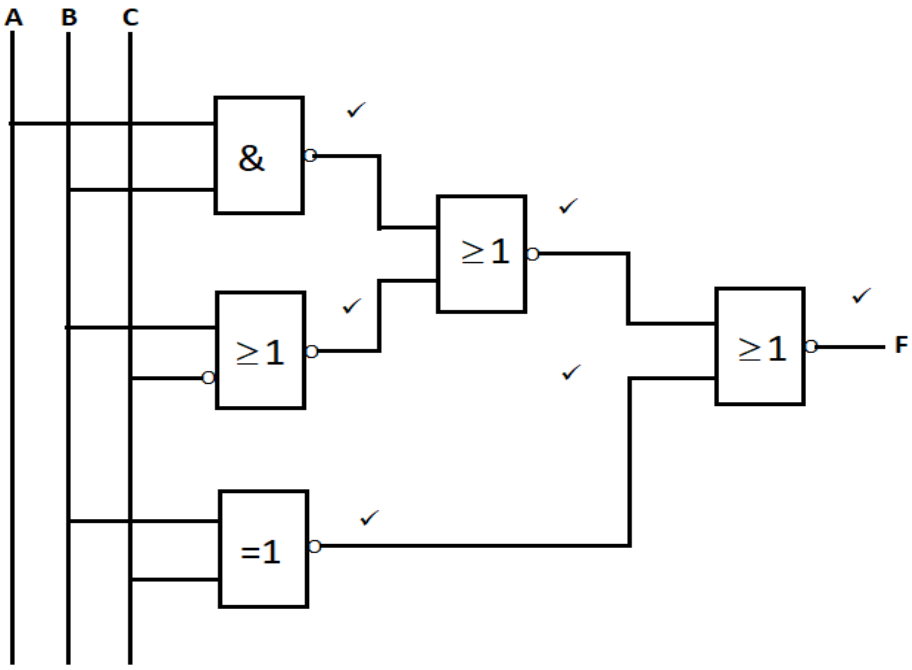
VRAAG 3

3.1 3.1.1



(5)

3.1.2



(6)

3.2 3.2.1

$$F = A\,B\,C + \overline{A}\,\overline{B}\,C + A\,\overline{B}\,\overline{C} + \overline{A}\,B\,\overline{C}$$

$$F = \overline{A}\,(\overline{B}C + B\overline{C}) + A\,(\overline{B}\overline{C} + BC) \checkmark$$

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

$$LET\ B \oplus C = K \checkmark$$

$$\therefore\ F = \overline{A}K + A\overline{K} \checkmark$$

$$= A \oplus K \checkmark$$

$$= A \oplus B \oplus C \checkmark$$

(6)

3.2.2 $F = \overline{X + \overline{X}Y + \overline{Y + Z}}$

$= \overline{(X + \overline{X}Y)}.(Y + Z)$ ✓

$= \overline{(X + Y)}.(Y + Z)$ ✓

$= \overline{X}.\overline{Y}.(Y + Z)$ ✓

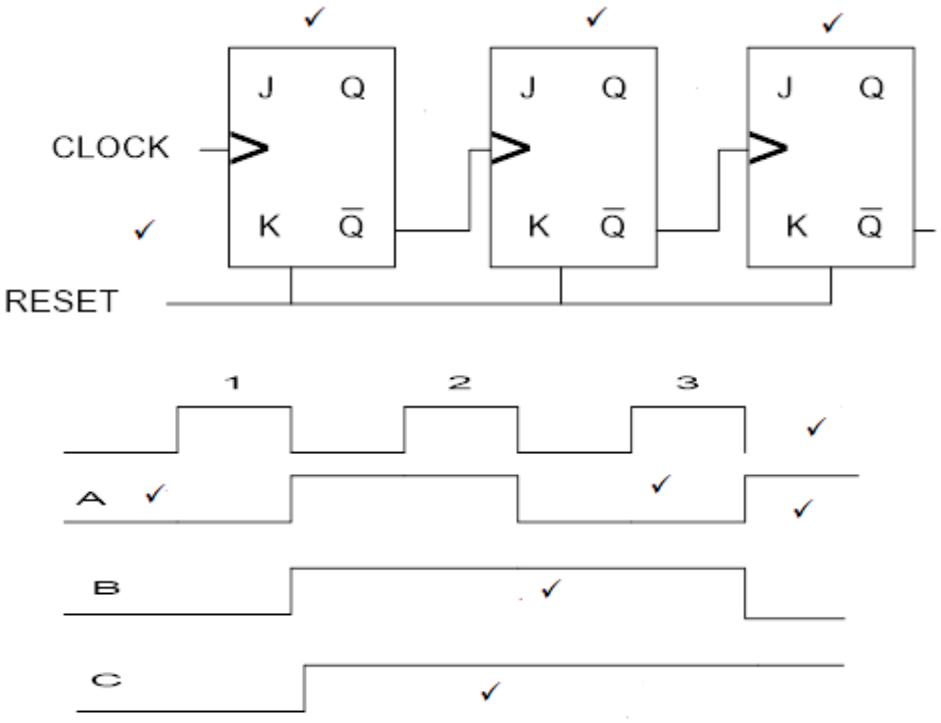
$= 0 + \overline{X}.\overline{Y}..Z$ ✓

$= \overline{X}.\overline{Y}.Z$ ✓

(5)
[22]

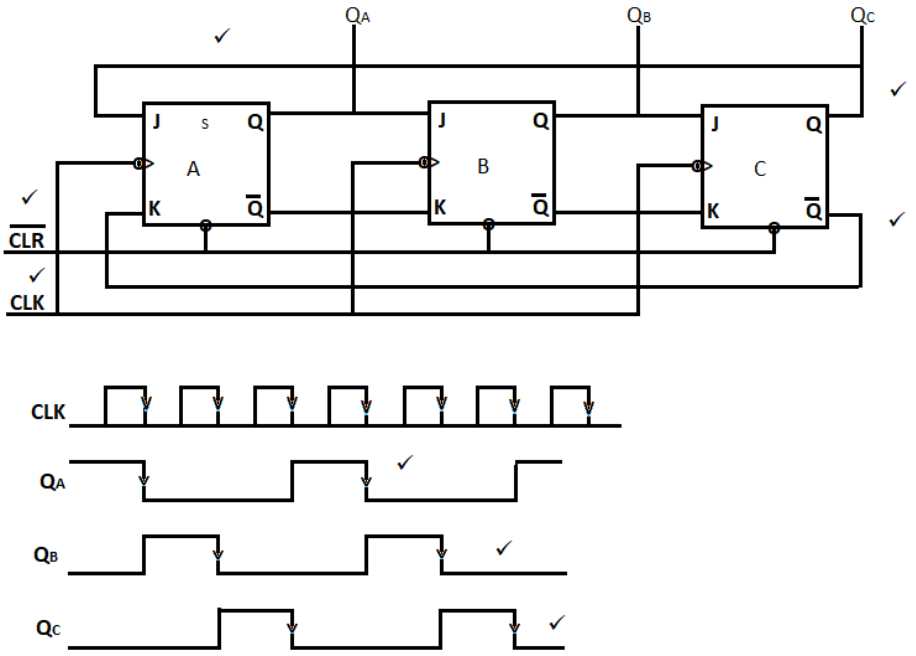
VRAAG 4

4.1



(10)

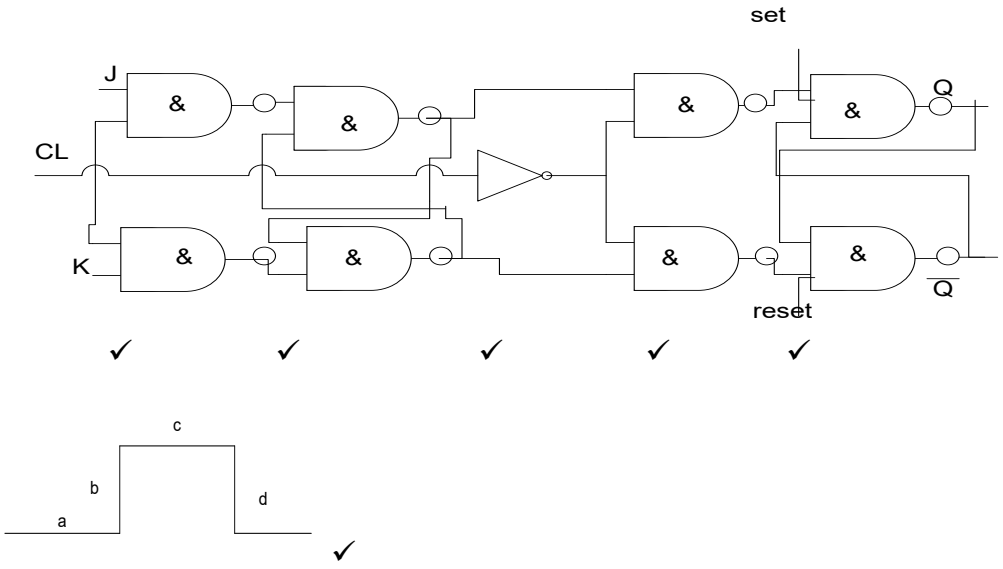
4.2



(8)
[18]

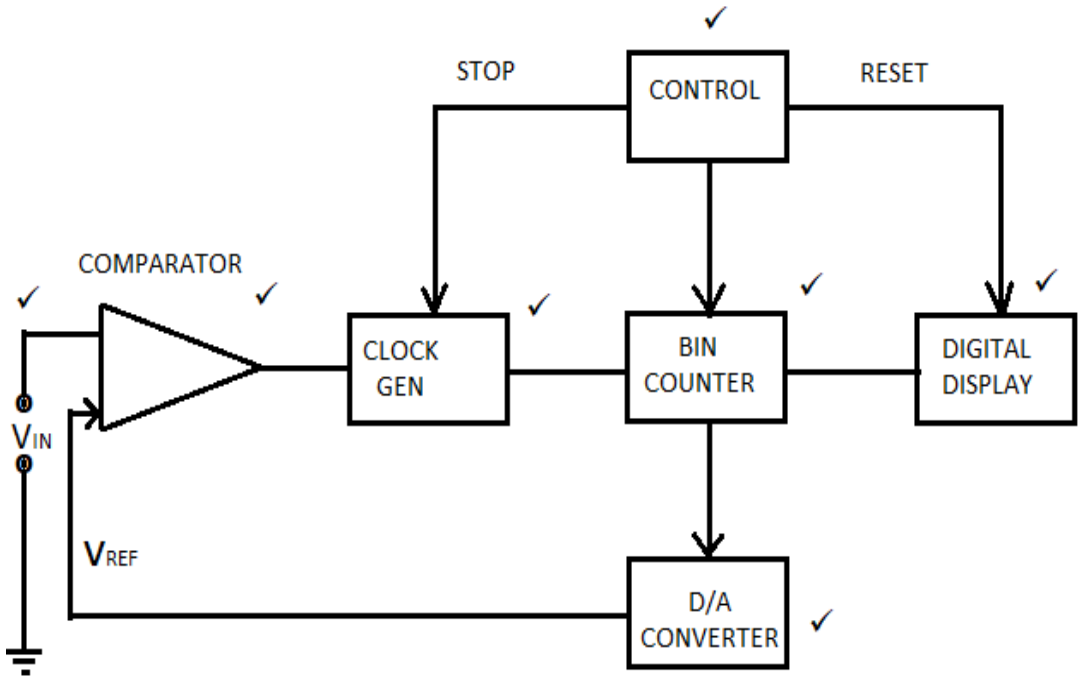
VRAAG 5

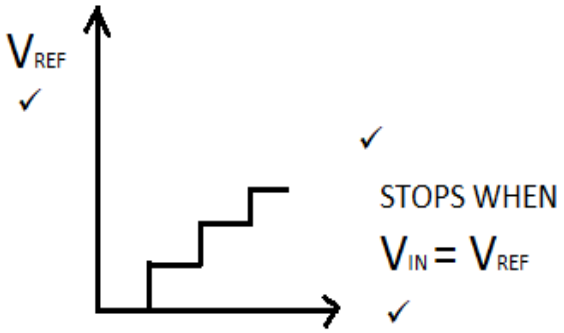
5.1



- By (a) is die puls by logika 0, die meester is af en die slaaf is aan.
- By (b) word die OF-hek afgesit voordat die meester se toestand verander danksy die stroominvoegresistor.
- By (c) is die puls by logika 1, die meester is aan en die slaaf is af.
- By (d) word die OF-hek afgesit, wat die toestand van die meester na die slaaf oordra danksy die stroominvoegresistor, en dus is die slaaf ontvanklik vir die meester op die agterrand. (10)

5.2





(10)
[20]

TOTAAL: 100

Kopiereg voorbehou