higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NASIENRIGLYN

NASIONALE SERTIFIKAAT

SYFERELEKTRONIKA N5

19 November 2020

Hierdie nasienriglyn bestaan uit 8 bladsye.

Kopiereg voorbehou

VRAAG 1

1.1

$E6,F_{16} \div 43,5_8$

$E6,F_{16} = 11100110,1111_2$ √

$43,5_8 = 100011,101_2$ √

$\therefore E6,F_{16} \div 43,5_8 = 11100110,1111_2 \div 100011,101_2$

$11100110,1111_2 \div 100011,101_2$

```
                          1 1 0 , 0 1 1 1√
1 0 0 0 1 1 1 0 1 0 √1 1 1 0 0 1 1 0 1 1 1 1 , 0 0 0 0
                  1 0 0 0 1 1 1 0 1 0
                   1 0 1 1 0 0 0 0 1 1
                   1 0 0 0 1 1 1 0 1 0
                   1 0 0 0 1 0 0 1 1 0 0          √
                     1 0 0 0 1 1 1 0 1 0
                    1 0 0 0 0 1 0 0 1 0 0
                      1 0 0 0 1 1 1 0 1 0
                        1 1 1 1 0 1 0 1 0 0
                        1 0 0 0 1 1 1 0 1 0 ✓
                          1 1 0 0 1 1 0 1 0✓
```

$\therefore 11100110,1\ 111_2 \div 100011,101_2 = 110,0111_2$ rem $\frac{110011010}{1000111010}$ √

$110,0111_2 = 6,7_{16}$√ (6)

1.2

$96,E_{16} = 10010110,\ 1110_2$
$= 10010110,111_2$ √

$53,2_8 = 101011,010_2$
$= 101011,01_2$ √

```
                    1 0 0 1 0 1 1 0 1 1 1
                          1 0 1 0 1 1 0 1
                    1 0 0 1 0 1 1 0 1 1 1
                1 0 0 1 0 1 1 0 1 1 1 0 0   √
              1 0 0 1 0 1 1 0 1 1 1 0 0 0
            1 0 0 1 0 1 1 0 1 1 1 0 0 0 0 0√
          1 0 0 1 0 1 1 0 1 1 1 0 0 0 0 0 0 0
          1 1 0 0 1 0 1 1 1 1 1 0 1 0 1 0 1 1√
```

$\therefore 96,E_{16} \times 53,2_8 = 10010110,111_2 \times 101011,01_2$

$\therefore 10010110,111_2 \times 101011,01_2 = 1100101111101,01011_2 = 14575,26_8$√ (6)

1.3 $122,3_8 = 001\ 010\ 010\ ,\ 011_2$
$= 1010010,011_2$✓

$122,B_{16} = 0001\ 0010\ 0010,\ 1011_2$
$= 100100010,1011_2$
$= 100100010,101_2$✓

$\therefore 1221,3_8 - 122,B_{16} = 1010010,011_2 - 100100010,101_2$

001010010,011
100100010,101 ⟶ 011011101,010 +1
No Carry

0 0 1 0 1 0 0 1 0 , 0 1 1
0 1 1 0 1 1 1 0 1 , 0 1 1✓
1 0 0 1 0 1 1 1 1 , 1 1 0

∴ the answer is negative, compleemnt the answer

0 1 1 0 1 0 0 0 0 , 0 0 1
+1✓
- 0 1 1 0 1 0 0 0 0 , 0 1 0

$\therefore 1010010,011_2 - 100100010,101_2 = -\ 11010000,010_2$✓
$= -\ 208,25_{10}$✓

(6)
[18]

VRAAG 2

A	B	C	D		J_A	K_A	J_B	K_B	J_C	K_C	J_D	K_D	
0	0	0	0		0	X	0	X	0	X	1	1	✓
0	0	0	1		0	X	0	X	1	X	X	X	✓
0	0	1	0		0	X	0	X	X	0	1	1	✓
0	0	1	1		0	X	1	X	X	1	X	X	✓
0	1	0	0		0	X	X	0	0	X	1	1	
0	1	0	1		0	X	X	0	1	X	X	X	✓
0	1	1	0		0	X	X	0	X	0	1	1	✓
0	1	1	1		1	X	X	1	X	1	X	X	✓
1	0	0	0		X	0	0	X	0	X	1	1	✓
1	0	0	1		X	1	0	X	0	X	X	X	✓

1010
1011
1100
1101
1110

Don't cares (X's) ✓

(10)

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	0	0	d	d
$\overline{C}D$	0	0	d	d
CD	0	1	d	d
$C\overline{D}$	0	0	d	d

$Ja = BCD$ ✓

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	d	d	d	0
$\overline{C}D$	d	d	d	1
CD	d	d	d	d
$C\overline{D}$	d	d	d	d

$Ka = D$ ✓

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	0	d	d	0
$\overline{C}D$	0	d	d	0
CD	1	d	d	d
$C\overline{D}$	0	d	d	d

$Jb = CD$ ✓

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	d	0	d	d
$\overline{C}D$	d	0	d	d
CD	d	1	d	d
$C\overline{D}$	d	0	d	d

$Kb = CD$ ✓

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	0	0	d	0
$\overline{C}D$	1	1	d	0
CD	d	d	d	d
$C\overline{D}$	d	d	d	d

$Jc = \overline{A}D$ ✓

	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	d	d	d	d
$\overline{C}D$	d	d	d	d
CD	d	1	d	d
$C\overline{D}$	0	0	d	d

$Kc = D$ ✓

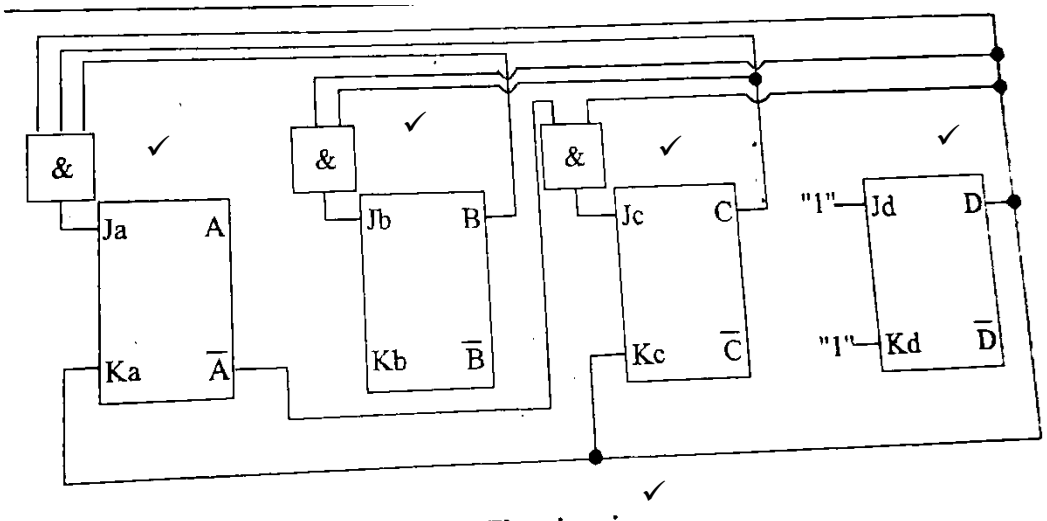
	$\overline{A}\overline{B}$	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	1	1	d	1
$\overline{C}D$	d	d	d	d
CD	d	d	d	d
$C\overline{D}$	1	1	d	d

$Jd = 1$ ✓

	AB	$\overline{A}B$	AB	$A\overline{B}$
$\overline{C}\overline{D}$	d	d	d	d
$\overline{C}D$	1	1	d	1
CD	1	1	d	d
$C\overline{D}$	d	d	d	d

$Kd = 1$ ✓

(8)



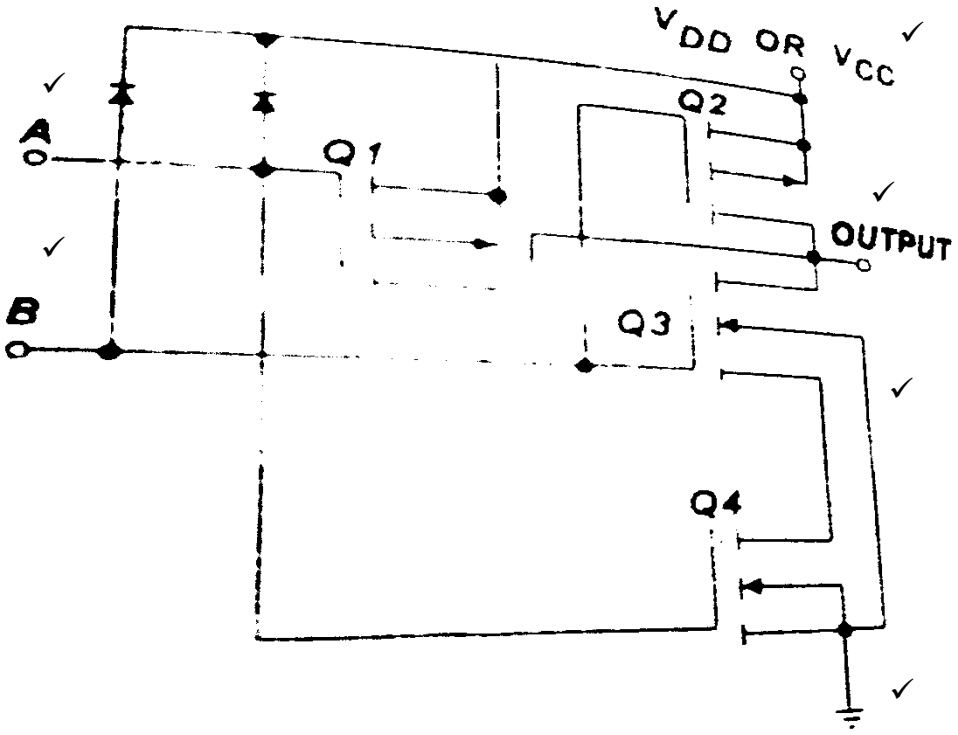
✓ ✓ ✓ ✓ ✓

The circuit

(5)
[23]

VRAAG 3

3.1



(6)

3.2 3.2.1 T3/T4.✓✓ (baie lae uitgangsimpedansie) voorkom oorbelasting wanneer ander TTL-hekke gekoppel word.✓✓ (4)

3.2.2 T5/T3 en T2/T4.✓✓ (baie goeie stroomversterker) omdat hul GS-voorspanningsvlakke met mekaar verband hou✓✓ (4)

3.3

	TTL	CMOS
Spoed	Stadiger	Vinniger ✓
Pakdigtheid	Laag	Hoog ✓
Drywing	Hoog	Laag ✓

(3)
[17]

VRAAG 4

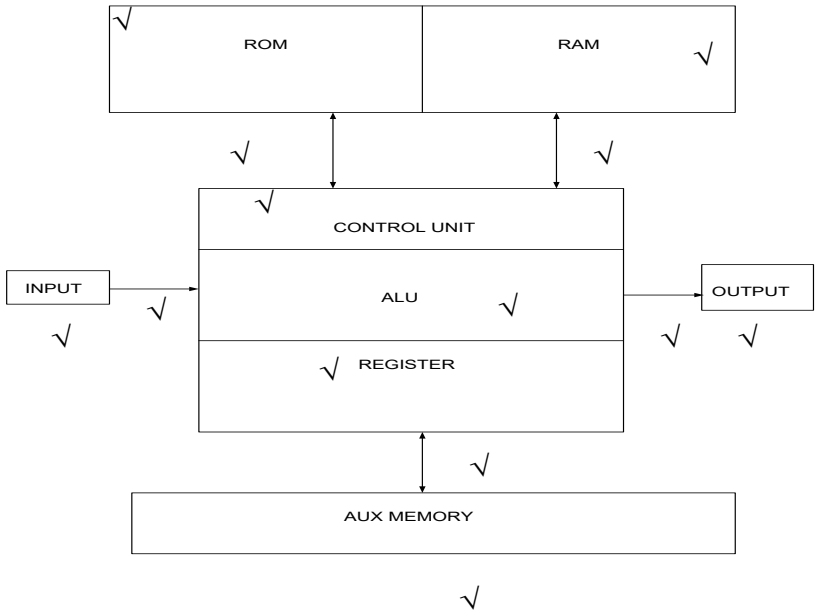
4.1 D
4.2 A
4.3 D
4.4 A
4.5 B
4.6 D
4.7 B
4.8 D
4.9 A
4.10 B

(10 × 1) **[10]**

VRAAG 5

5.1
- Vlugtige geheue verloor alle inligting as die krag afgeskakel word.
- Nievlugtige geheue behou inligting, selfs as krag afgeskakel word. (2)

5.2



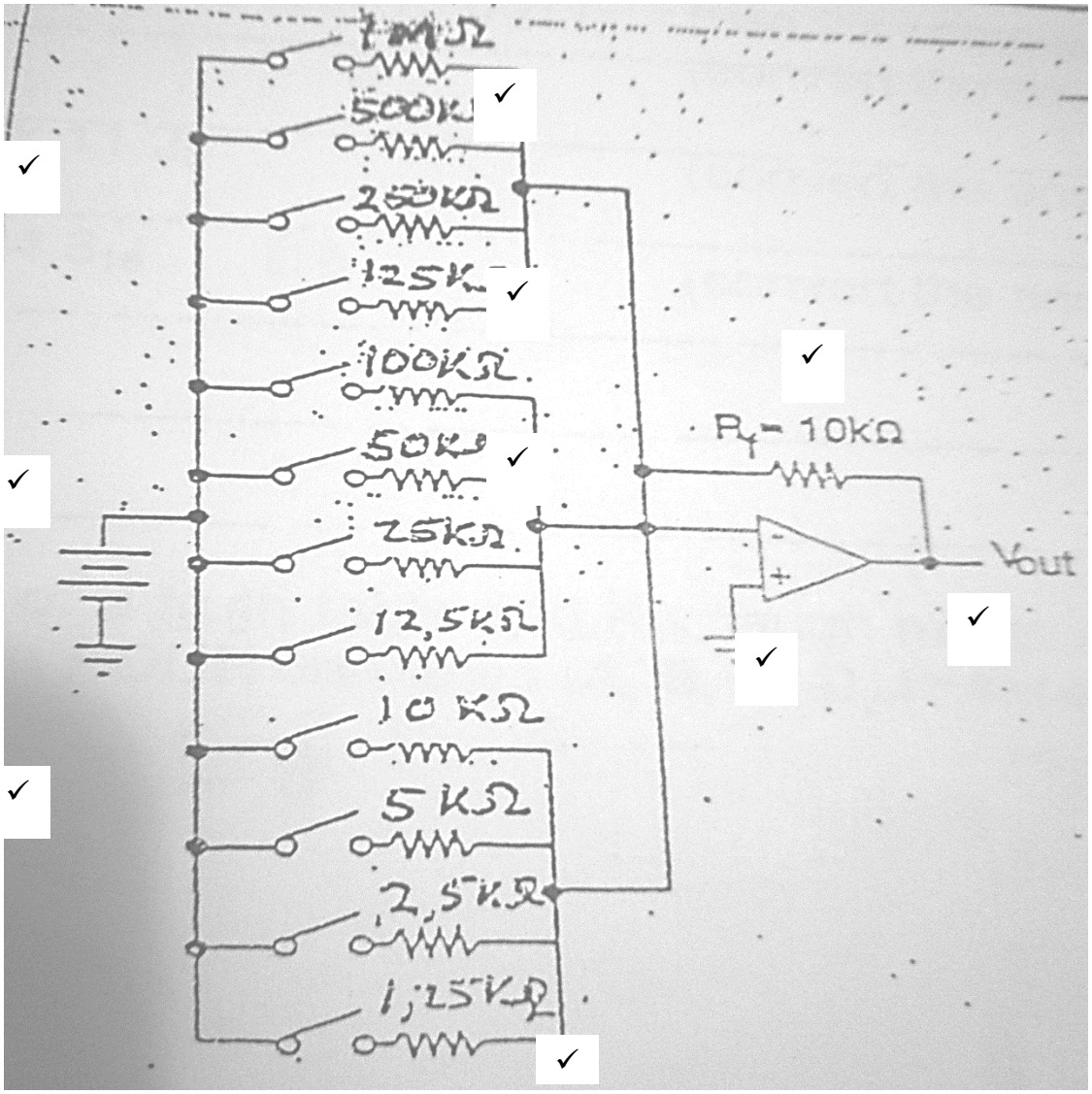
(13)
[15]

VRAAG 6

6.1 Modulator✓/Demodulator✓ – verander hoëfrekwensiedata in klankfrekwensie wat oor telefoonlyne gestuur kan word✓ (versendingskant – modulasie) en verander klankfrekwensies van die telefoonlyne na hoëfrekwensie-dataseine✓ (ontvangkant – demodulasie). (4)

6.2 Om rekenaardata seriegewys te versend en sodoende die aantal transmissiekabels wat benodig word te verminder.✓ Dit bestaan uit 'n parallel-in serie-uit skuifregister aan die versendingskant en 'n serie-in parallel-uit skuifregister aan die ontvangkant.✓ Dit werk in die asinchrone modus.✓ (3)
[7]

VRAAG 7



[10]

TOTAAL: 100

Kopiereg voorbehou