



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

29 November 2024

This marking guideline consists of 6 pages.

QUESTION 1

	$\wedge$		$\wedge$		$\wedge$		$\wedge$	
A	B	C	J_A	K_A	J_B	K_B	J_C	K_C
1	0	0	$\emptyset$	0	1	$\emptyset$	0	$\emptyset$
1	1	0	$\emptyset$	0	$\emptyset$	0	1	$\emptyset$
1	1	1	$\emptyset$	1	$\emptyset$	0	$\emptyset$	0
0	1	1	0	$\emptyset$	$\emptyset$	1	$\emptyset$	0
0	0	1	0	$\emptyset$	0	$\emptyset$	$\emptyset$	1
0	0	0	1	$\emptyset$	0	$\emptyset$	0	$\emptyset$
1	0	1	$\emptyset$	0	0	$\emptyset$	$\emptyset$	1
0	1	0	1	$\emptyset$	$\emptyset$	1	0	$\emptyset$

$Q_n \rightarrow Q_{n+1}$	J	K
$0 \rightarrow 0$	0	$\emptyset$
$0 \rightarrow 1$	1	$\emptyset$
$1 \rightarrow 0$	$\emptyset$	1
$1 \rightarrow 1$	$\emptyset$	0

	00	01	11	10	
0	$\emptyset$	1	$\emptyset$	$\emptyset$	$\wedge$
1	0	0	$\emptyset$	$\emptyset$	

$$J_A = \neg C \quad \wedge$$

	00	01	11	10	
0	$\emptyset$	$\emptyset$	0	0	$\wedge$
1	$\emptyset$	$\emptyset$	1	0	

$$K_A = BC \quad \wedge$$

	00	01	11	10	
0	0	$\emptyset$	$\emptyset$	1	$\wedge$
1	0	$\emptyset$	$\emptyset$	0	

$$J_B = A/C \quad \wedge$$

	00	01	11	10	
0	$\emptyset$	1	0	$\emptyset$	$\wedge$
1	$\emptyset$	1	0	$\emptyset$	

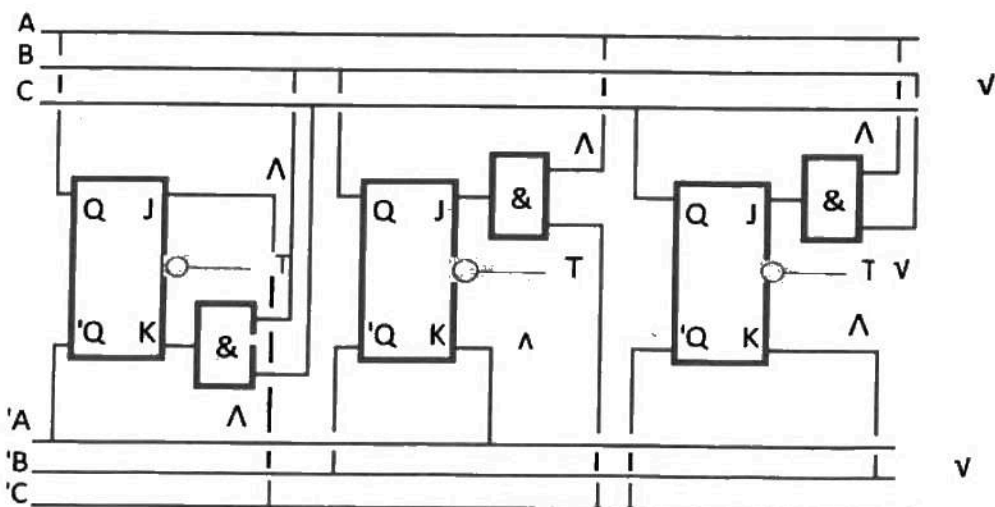
$$K_B = \neg A \quad \wedge$$

	00	01	11	10	
0	0	0	1	0	$\wedge$
1	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	

$$J_C = AB \quad \wedge$$

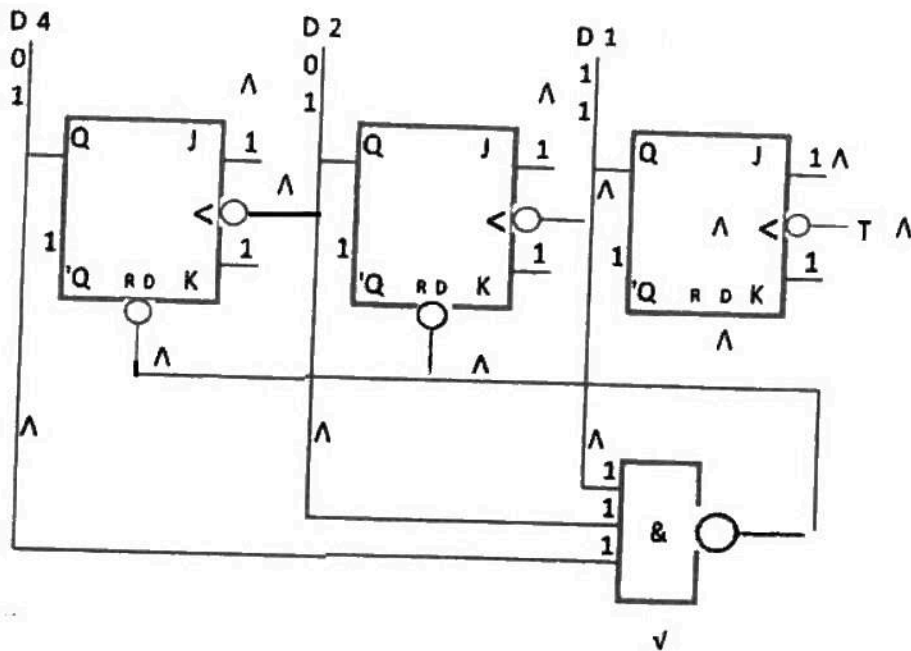
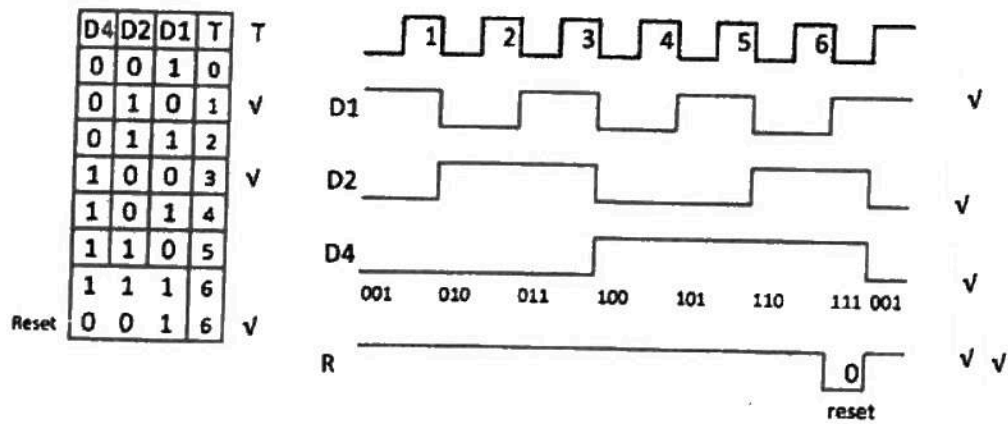
	00	01	11	10	
0	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$	$\wedge$
1	1	0	0	1	

$$K_C = \neg B \quad \wedge$$



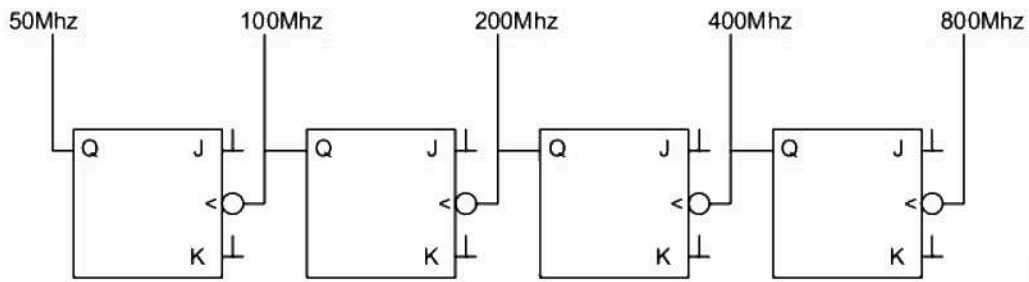
[15]

QUESTION 2



[15]

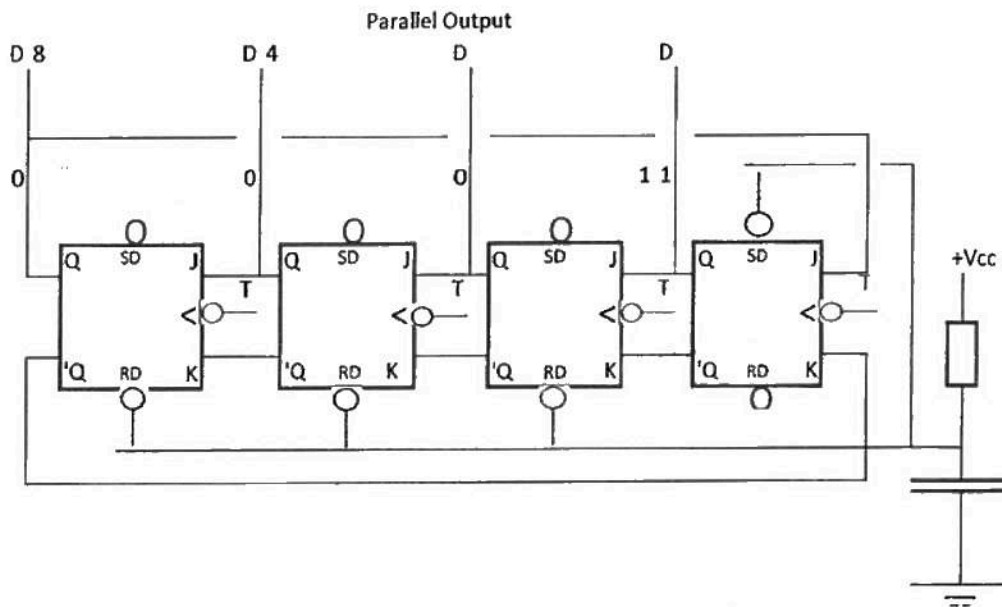
QUESTION 3



[10]

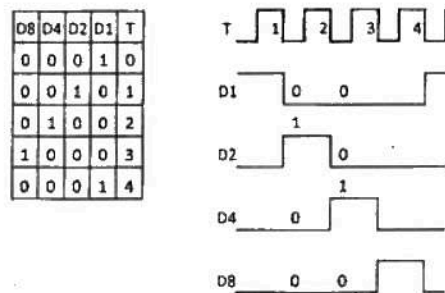
QUESTION 4

4.1



(7)

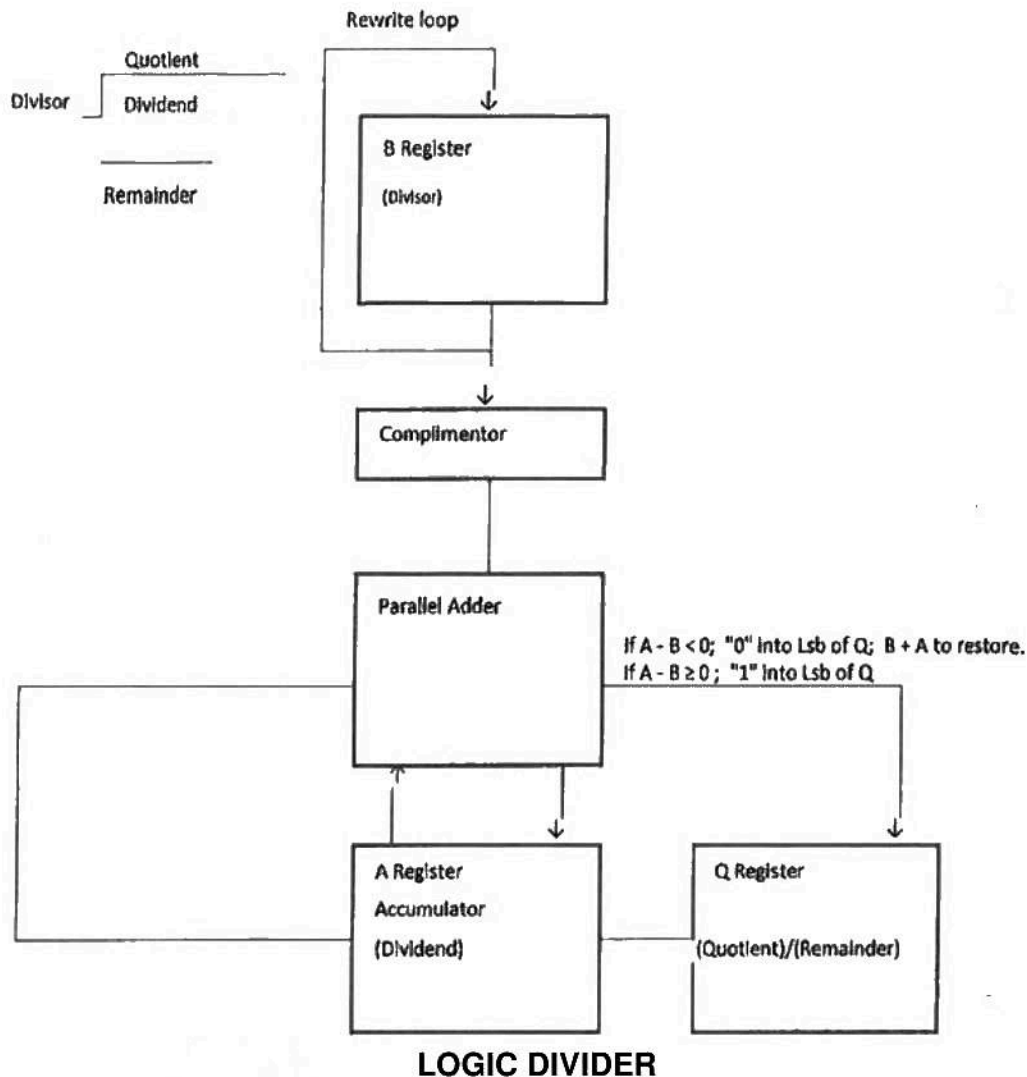
4.2



(5)
[12]

QUESTION 5

5.1



(8)

5.2

Operation:

The dividend is loaded into the A register.

The divisor is loaded into the B register.

The Q register is set to zero.

The B register number is shifted left n times until its MSB is in line with the MSB of the dividend in the A register.

The divisor will be subtracted n+1 times from the accumulator.

For each successful subtraction a 1 is stored in the LSB flip-flop of the Q register.

For each unsuccessful subtraction a 0 is stored in the LSB flip-flop of the Q register.

When all the subtractions are completed the Q register contains the quotient.

The accumulator and Q register are shifted right until all the quotient bits in the Q register are removed at which time the remainder will be in the A and Q registers.

(7)

[15]

QUESTION 6

- 6.1 Random access memory: It is a volatile, ✓ small memory ✓ and has fast access time. ✓✓ (4)
- 6.2 Read only memory: It is a non-volatile memory ✓ where data cannot be changed ✓ and can only be read from the memory. ✓✓ (4)
- 6.3 Magnetic tape: It is non-volatile ✓ portable memory ✓ and has a large amount of storage space with serial access. ✓✓ (4)
- 6.4 Magnetic core memory: It is a non-portable memory ✓ that is volatile ✓ with a small amount of storage space. ✓ It has an outdated memory that is not used in the PC environment. ✓ (4)
- 6.5 Flash memory: It is a portable memory ✓ that is non-volatile ✓ with a large amount of storage space ✓ with random access. ✓ (4)
- [20]**

QUESTION 7

- 7.1
 - Drum
 - Chain
 - Dot Matrix(3)
- 7.2
 - Laser
 - Inkjet
 - Graph
 - Thermal
 - Static(5)
- 7.3
 - Laser
 - Inkjet
 - Static
 - Dot Matrix
 - Thermal
 - Graph(Any 3 × 1) (3)
- 7.4 Graph (1)
- 7.5 Laser (1)
- [13]**
- TOTAL: 100**