higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

6 August 2021

This marking guideline consists of 6 pages.

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QUESTION 1

A	B	C	J_A ^	K_A ^	J_B ^	K_B ^	J_C ^	K_C ^
0	0	0	1	Ø	1	Ø	1	Ø
1	1	1	Ø	1	Ø	1	Ø	0
0	0	1	1	Ø	1	Ø	Ø	1
1	1	0	Ø	1	Ø	0	0	Ø
0	1	0	1	Ø	Ø	1	1	Ø
1	0	1	Ø	1	0	Ø	Ø	1
0	1	1	0	Ø	Ø	1	Ø	1
1	0	0	Ø	1	0	Ø	0	Ø

$Q_n \rightarrow Q_n + 1$	J	K
0 → 0	0	Ø
0 → 1	1	Ø
1 → 0	Ø	1
1 → 1	Ø	0

^ =1/2 mark

J_A

	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	1	1	Ø	Ø
c 1	1	0	Ø	Ø

J_A =/B + /C ^

K_A

	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	Ø	Ø	1	1
c 1	Ø	Ø	1	1

K_A = 1 ^

J_B

	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	1	Ø	Ø	0
c 1	1	Ø	Ø	0

J_B =/A ^

K_B

	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	Ø	1	0	Ø
c 1	Ø	1	1	Ø

K_B =/A + C ^

J_C

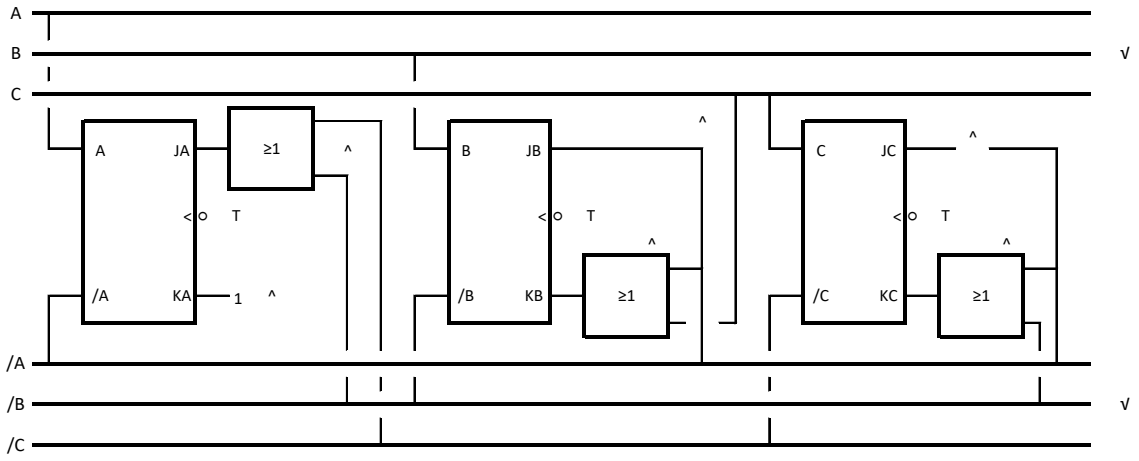
	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	1	1	0	0
c 1	Ø	Ø	Ø	Ø

J_C = /A ^

K_C

	/A/B 00	/AB 01	AB 11	A/B 10 ^
/c 0	Ø	Ø	Ø	Ø
c 1	1	1	0	1

K_C =/A+/B ^

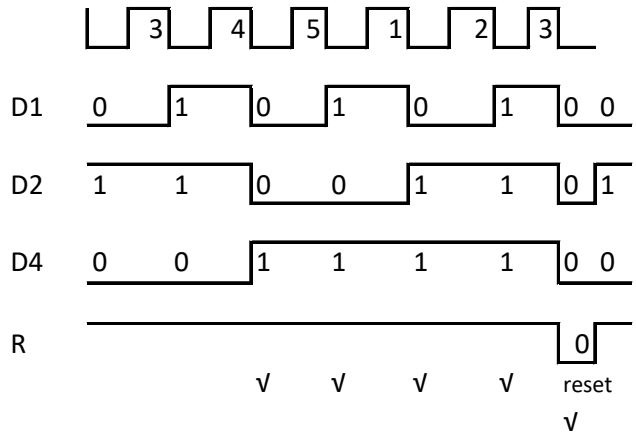


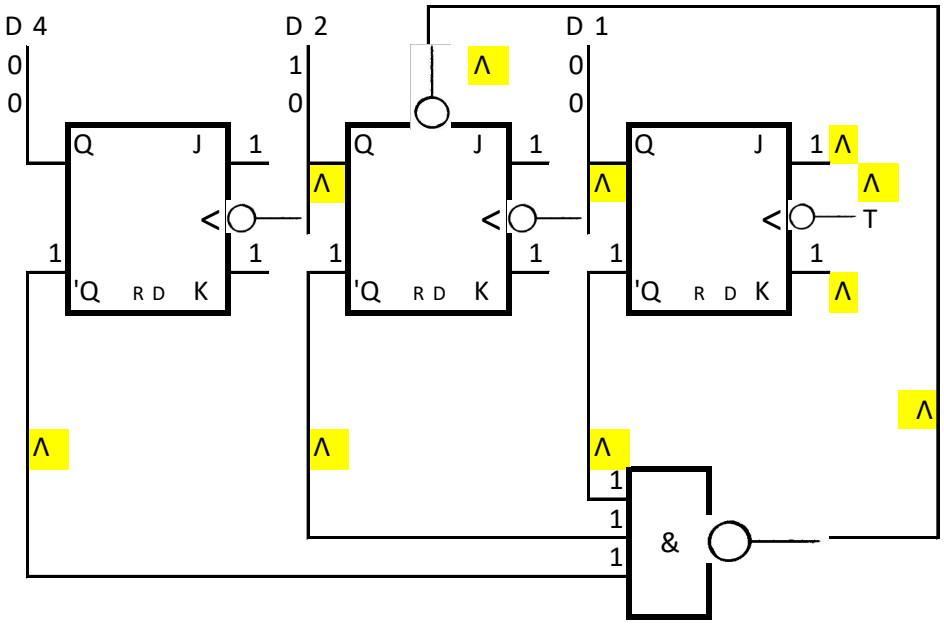
[15]

QUESTION 2

D4	D2	D1	T	
0	1	0	0	T
0	1	1	1	√
1	0	0	2	√
1	0	1	3	√
1	1	0	4	√
1	1	1	5	√
0	0	0	6	
0	1	0		

Reset

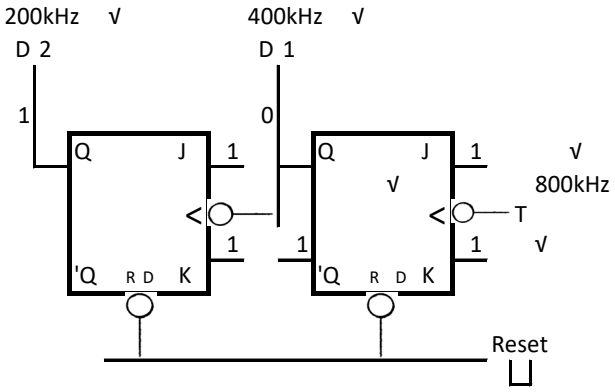




[15]

QUESTION 3

3.1



(5)

3.2 Generates the gate open signal✓ by dividing✓ the reference oscillator✓ frequency y a factor✓ of 10.✓ (5)

3.3
- Time measurement
- Totalising
- Frequency
- Period measurement
- Frequency Ratio (5)

[15]

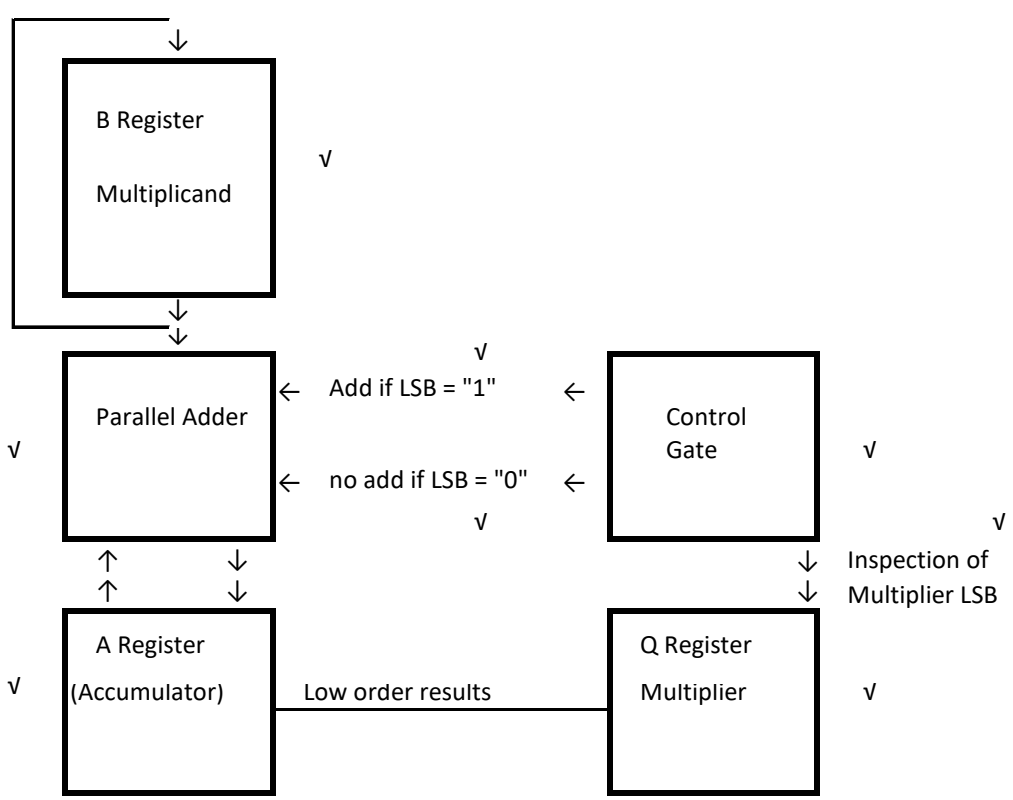
QUESTION 4

4.1 False
4.2 True
4.3 True
4.4 True
4.5 False
4.6 True
4.7 True
4.8 False
4.9 True
4.10 False
4.11 False
4.12 True
4.13 False
4.14 False
4.15 True

(15 × 1) **[15]**

QUESTION 5

5.1



(8)

5.2
- If the LSB of the multiplier is 1 the multiplicand is added to the accumulator register contents.
- If the LSB of the multiplier is 0 the multiplicand is not added to the accumulator register contents.
- After the add or no-add the accumulator and Q register contents are shifted right.
- The above cycle is repeated for the rest of the bits in the multiplier.
- The final answer is in the accumulator register. (7)

[15]

QUESTION 6

6.1
- The computer stores the program instructions
- and data in the SRAM or DRAM
- when the computer is running and
- when the computer is not running
- the program instructions and data are stored in the Hard Drive. (5)

6.2

6.2.1	E	
6.2.2	G	
6.2.3	J	
6.2.4	I	
6.2.5	C	
6.2.6	A	
6.2.7	D	
6.2.8	B	
6.2.9	F	
6.2.10	H	

(10 × 1) (10)
[15]

QUESTION 7

7.1

7.1.1	Impact	
7.1.2	Non-impact	
7.1.3	Impact	
7.1.4	Impact	
7.1.5	Non-impact	

(5 × 1) (5)

7.2

7.2.1	False	
7.2.2	False	
7.2.3	True	
7.2.4	False	
7.2.5	True	

(5 × 1) (5)
[10]

TOTAL: 100

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