higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

19 November 2020

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	0	Ø	0	Ø	1	Ø	
0	0	1	0	Ø	1	Ø	Ø	0	
0	1	1	1	Ø	Ø	0	Ø	0	Λ
1	1	1	Ø	0	Ø	0	Ø	1	
1	1	0	Ø	0	Ø	1	0	Ø	
1	0	0	Ø	1	0	Ø	0	Ø	
0	1	0	0	Ø	Ø	1	0	Ø	Λ
1	0	1	Ø	1	0	Ø	Ø	1	

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

	00	01	11	10	
0	0	0	Ø	Ø	Λ
1	0	1	Ø	Ø	

J_A = BC Λ

	00	01	11	10	
0	Ø	Ø	0	1	Λ
1	Ø	Ø	0	1	

K_A = /B Λ

	00	01	11	10	
0	0	Ø	Ø	0	Λ
1	1	Ø	Ø	0	

J_B =/AC Λ

	00	01	11	10	
0	Ø	1	1	Ø	Λ
1	Ø	0	0	Ø	

K_B = /C Λ

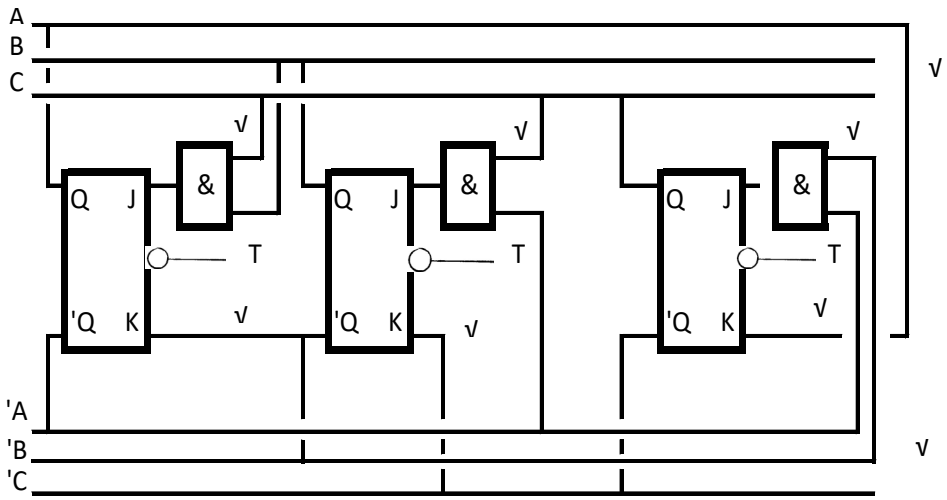
	00	01	11	10	
0	1	0	0	0	Λ
1	Ø	Ø	Ø	Ø	

J_C = /A/B Λ

	00	01	11	10	
0	Ø	Ø	Ø	Ø	Λ
1	0	0	1	1	

K_C = A Λ

(7)

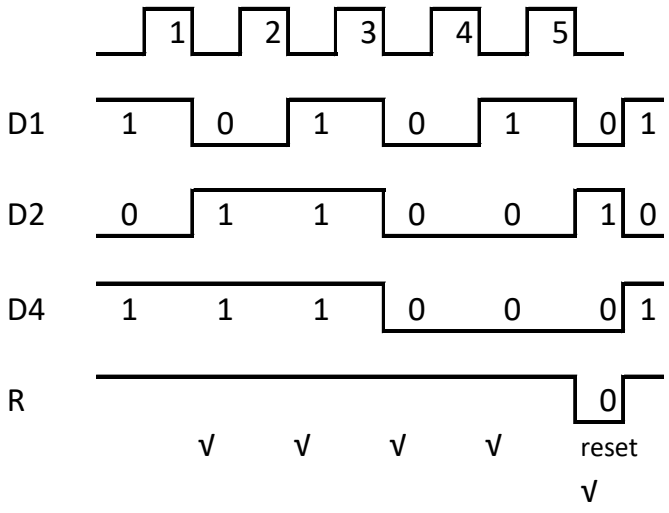


(8)

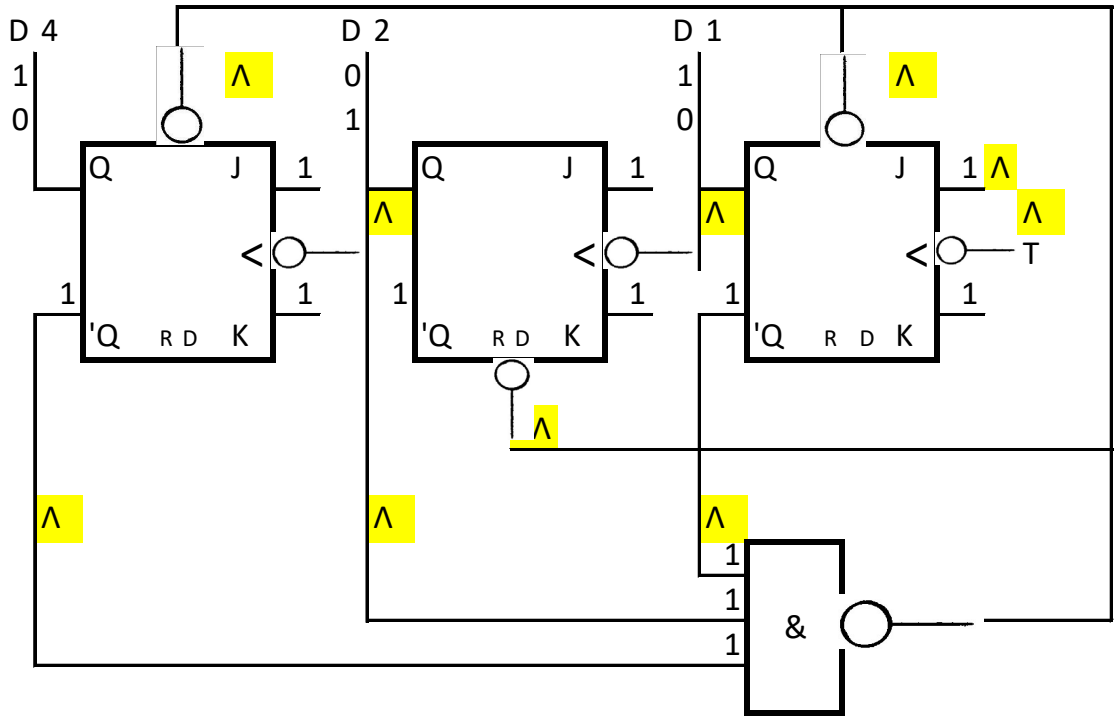
(8)
[15]

QUESTION 2

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



(10)

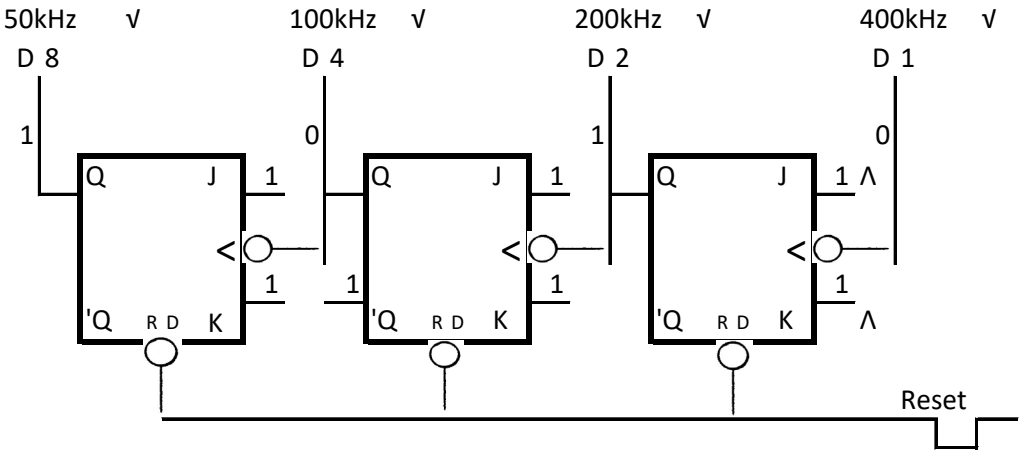


Λ= 1/2 mark 10 * 1/2 = 5 marks

(5)
[15]

QUESTION 3

3.1



(5)

3.2 $400/50 = 8 = 2^3$ therefore, 3 flip-flops required

OR

Each flip-flop divides it clock input frequency by 2, therefore 3 flip-flops are required. (5)

[10]

QUESTION 4

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

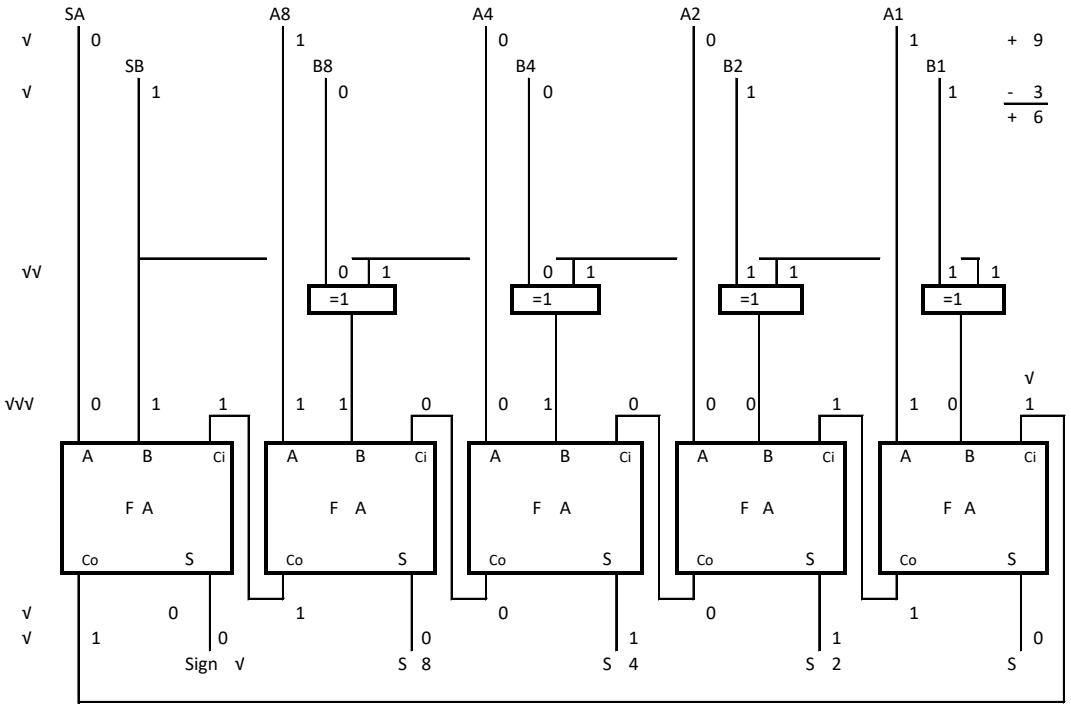
(15 × 1) **[15]**

QUESTION 5

5.1 The purpose of an ALU is to perform the arithmetic and logic functions in a computer. (2)

5.2 Parallel 1's complimentary adder. (2)

5.3



√ = 1 mark. (11)

[15]

QUESTION 6

6.1 6.1.1 Static RAM cell
6.1.2 Magnetic Drum
6.1.3 Stiffy Drive

(3 × 1) (3)

6.2 6.2.1 3A (1)
6.2.2 None (1)
6.2.3 3A (1)
6.2.4 3B, 3C (2)
6.2.5 3A (1)
6.2.6 3B, 3C (2)
6.2.7 3B (1)
6.2.8 3B (1)
6.2.9 3B, 3C (2)

[15]

QUESTION 7

7.1	D,H	(2)
7.2	D,F,H	(3)
7.3	A,B,C,E,G	(5)
7.4	B,C,F,G	(3)
7.5	C	(1)
7.6	G	(1)
		[15]

TOTAL: 100

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