higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

8 AUGUST 2018

This marking guideline consists of 6 pages.

Copyright reserved

QUESTION 1

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

	00	01	11	10	
0	1	1	Ø	Ø	∧
1	0	0	Ø	Ø	

$J_A = /C$ ∧

	00	01	11	10	
0	Ø	Ø	0	0	∧
1	Ø	Ø	1	0	

$K_A = BC$ ∧

	00	01	11	10	
0	0	Ø	Ø	1	∧
1	0	Ø	Ø	0	

$J_B = A/C$ ∧

	00	01	11	10	
0	Ø	1	0	Ø	∧
1	Ø	1	0	Ø	

$K_B = /A$ ∧

	00	01	11	10	
0	0	0	1	0	∧
1	Ø	Ø	Ø	Ø	

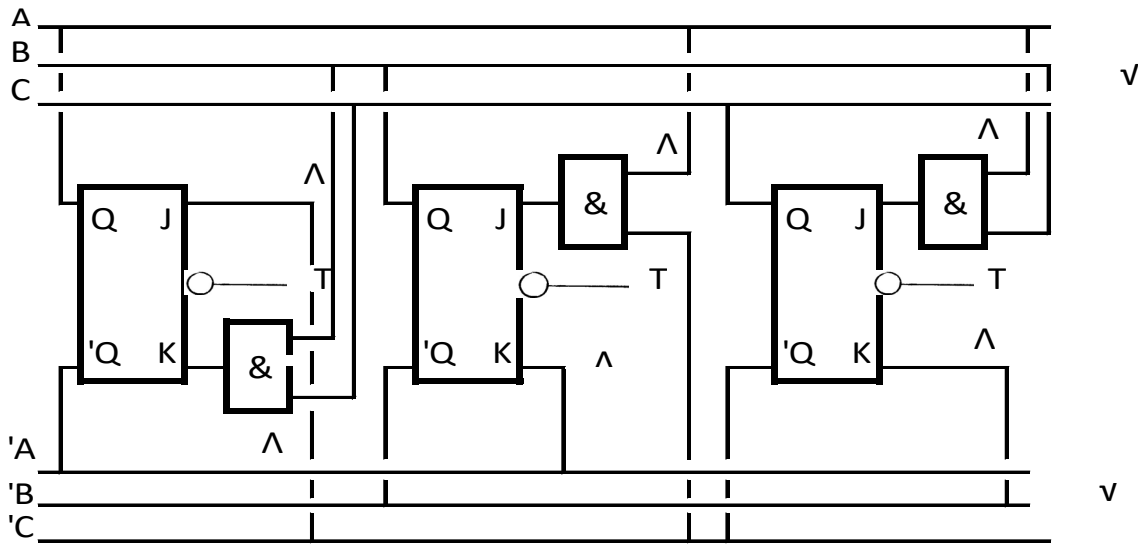
$J_C = AB$ ∧

	00	01	11	10	
0	Ø	Ø	Ø	Ø	∧
1	1	0	0	1	

$K_C = /B$ ∧

(10)

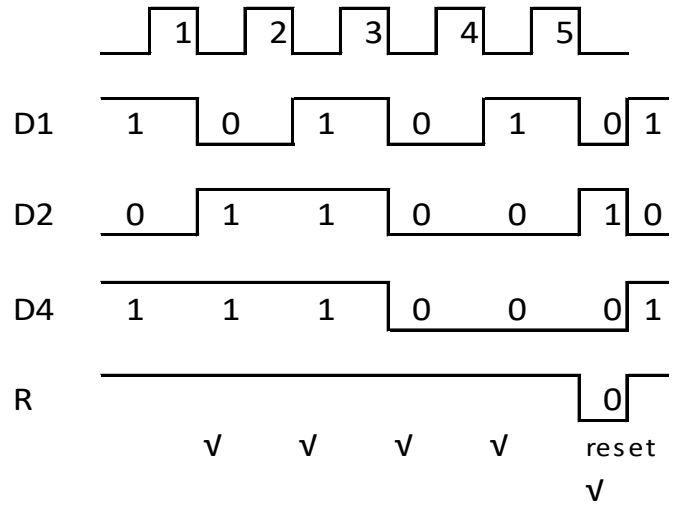
(7)



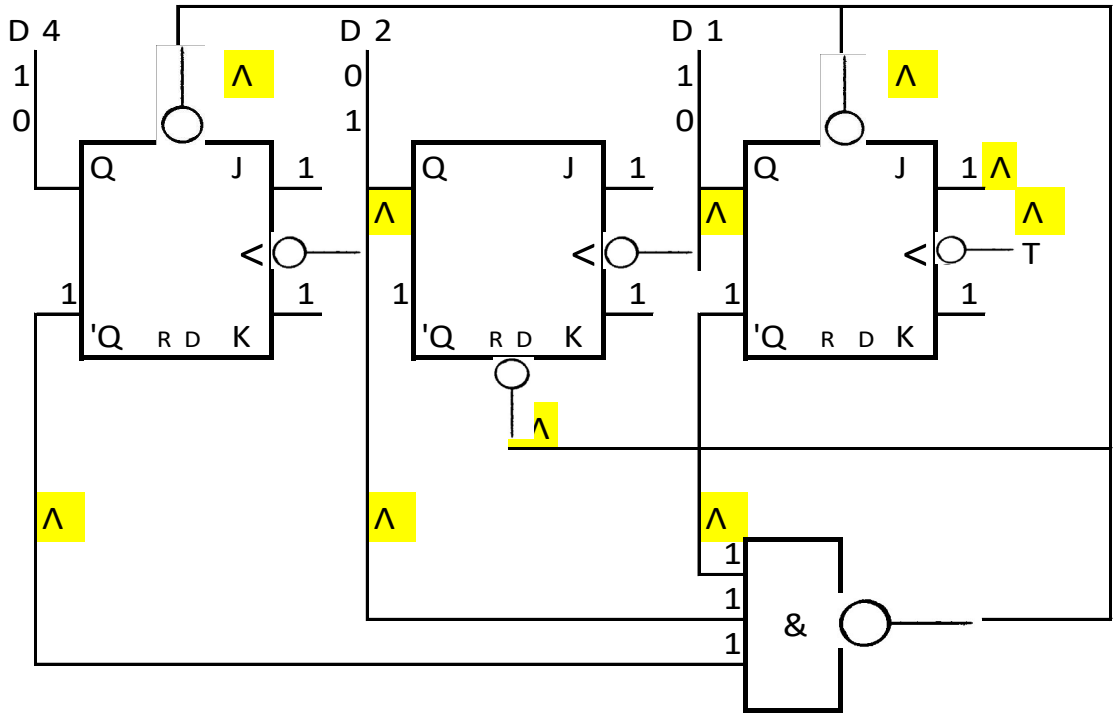
(8)
[15]

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 A gate is manually started (opened) and stopped (closed).
During this period of time the total number of pulses are counted and displayed.

3.2 A gate is kept open electronically (by a time base divider) for an exact period of time usually one second.
During this period of time the number of x clock pulses are counted and displayed giving us frequency of x.

3.3 A divide by 60 counter counts a 1Hz pulse and displays seconds counted.
A second divide by 60 counter counts every 60 seconds and displays the minutes counted.
A third divide by 12 counter counts every 60 minutes and displays hours counted.

(5 × 3) **[15]**

QUESTION 4

4.1 Left shift ring counter (1)

4.2 Right shift Johnson counter (1)

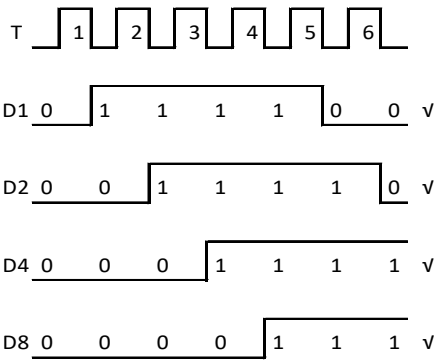
4.3 Left shift Johnson counter (1)

4.4 Left shift register (1)

4.5 Right shift ring counter (1)

4.6 0111 (1)

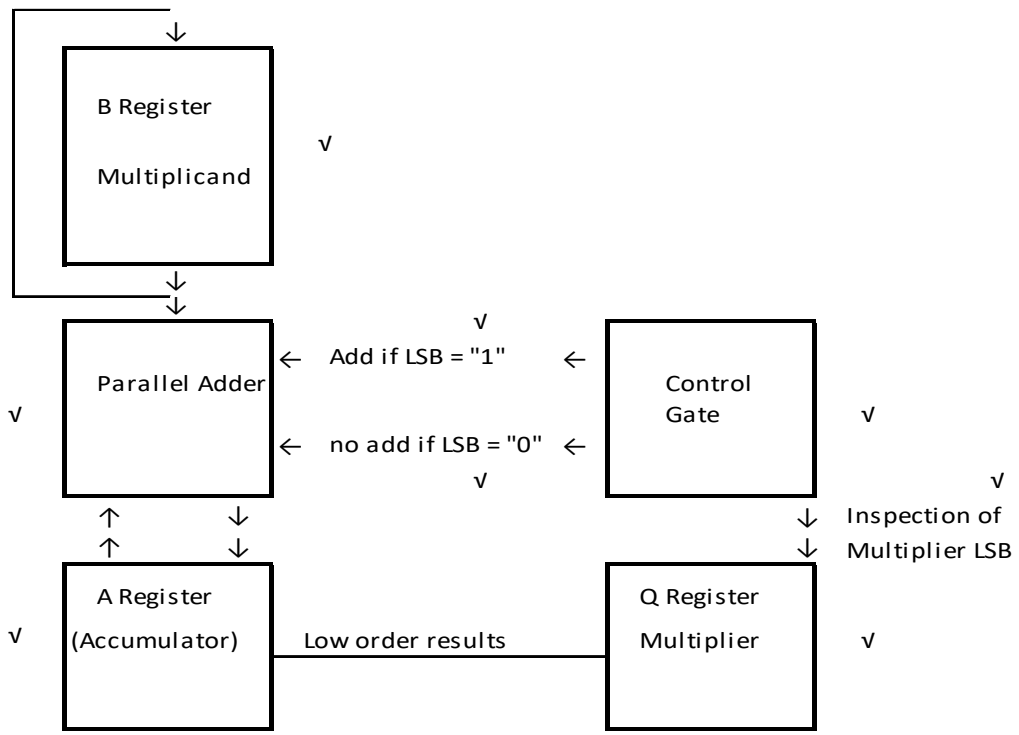
4.7



(4)
[10]

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 Volatile memory is computer memory that requires power to maintain the stored information, unlike non-volatile memory which does not require a maintained power supply. (2)

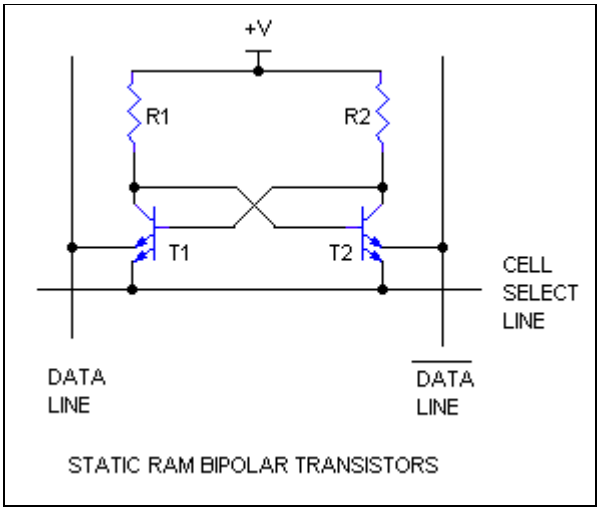
6.2 SRAM memory is a type of semiconductor memory where the word static indicates that it does not need to be periodically refreshed (while power is maintained) (2)

6.3 DRAM memory is a type of random access memory that stores each bit of data in a separate capacitor within an integrated circuit. (2)

6.4 Non-volatile memory (NVM) is computer memory that can retain the stored information even when not powered.

Examples are ROM, flash memory, hard disks, floppy disks, magnetic tape, optical discs, and early computer storage methods such as paper tape and punch cards. (4)

6.5



(1 mark for ANY 5 labels)
(1 mark for correct circuit plus 1 mark for any 4 correct labels) (5)
[15]

QUESTION 7

7.1
7.1.1 False
7.1.2 False
7.1.3 True
7.1.4 False
7.1.5 True
7.1.6 True

(6 × 1) (6)

7.2
7.2.1 Non-impact
7.2.2 Impact
7.2.3 Non-impact
7.2.4 Impact
7.2.5 Impact

(5 × 1) (5)

7.3 Both printers build up their characters as a matrix of dots (2)

7.4 Both printers use pre-formed characters (2)
[15]

TOTAL: 100

Copyright reserved