



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

LOGIC SYSTEMS N3

1 APRIL 2014

This marking guideline consists of 7 pages.

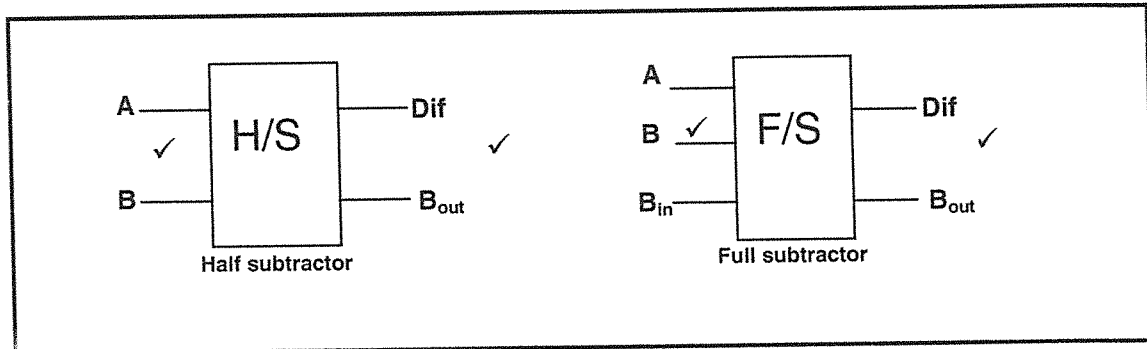
SECTION A**QUESTION 1**

1.1	1.1.1	B ✓		(1)
	1.1.2	A ✓		(1)
	1.1.3	C ✓✓		(2)
	1.1.4	C ✓		(1)
	1.1.5	B ✓		(1)
	1.1.6	D ✓		(1)
	1.1.7	D ✓		(1)
	1.1.8	C ✓		(1)
	1.1.9	D ✓		(1)
1.2	1.2.1	False		
	1.2.2	False		
	1.2.3	True		
	1.2.4	True		
	1.2.5	True		
	1.2.6	False		
	1.2.7	False		
	1.2.8	True		
	1.2.9	False		
	1.2.10	True		
			(10 x 1)	(10)
1.3	1.3.1	C		
	1.3.2	A		
	1.3.3	D		
	1.3.4	E		
	1.3.5	B		
			(5 x 1)	(5)
TOTAL SECTION A:				25

SECTION B

QUESTION 2

2.1



2.4 2.4.1

3	7
011	111

$$\therefore 37_8 = 11111_2 \checkmark$$

			1	1	1	1	1
					1	0	1
			1	1	1	1	1
		0	0	0	0	0	
	1	1	1	1	1		
1	0	0	1	1	0	1	1✓
2			3			3	

$$10011011_2 = 233_8 \checkmark$$

(3)

2.4.2

8	4	2	1
1	0	1	0

$$\therefore 10_{10} = 1010_2 \checkmark$$

						1	1	1	1	✓
1	0	1	0	1	0	0	1	1	0	
				1	0	1	0			
				1	0	0	0	1		
				1	0	1	0			✓
				0	1	1	1	1		
					1	0	1	0	0	
					0	1	0	1	0	
						1	0	1	0	
									0	

8	4	2	1
1	1	1	1

$$\therefore 1111_2 = 15_{10} \checkmark$$

(4)

2.5 2.5.1

4221	4221	4221
1100	0011	1111
↓	↓	↓
6	3	9

2.5.2

1	1	0	0	0	0	1	1	1	1	1	1
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum	Sum
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
1	0	1	0	0	0	1	0	0	0	0	0

Binary string	4221 BCD	Gray code
1100 0011 1111	639✓✓✓	101000100000✓✓✓✓

(7)
[30]

QUESTION 3

3.1 3.1.1 Logic 0 ✓✓ (2)

3.1.2 Logic 1 ✓✓ (2)

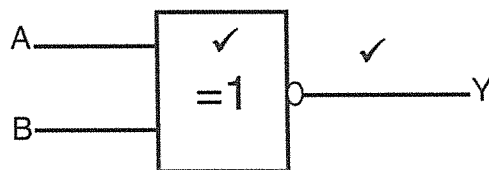
3.1.3

A✓	B✓	Y ✓
0	0	1
0	1	0
1	0	0
1	1	0

3.1.4 NOR gate ✓✓ (2)

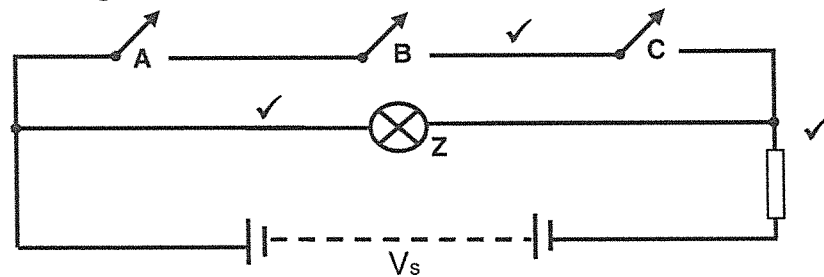
3.1.5 DTL or Diode Transistor Logic ✓ (1)

3.2



(2)

3.4 Three-input NAND gate.

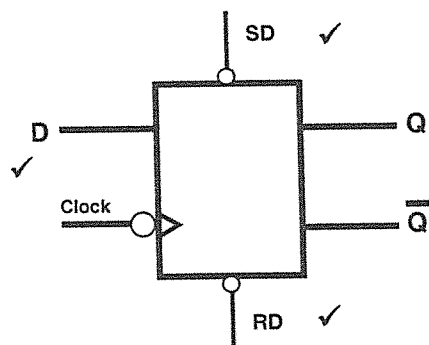
(3)
[15]**QUESTION 4**

4.1

POSITIONS	MASTER	SLAVE
1	Closed✓	Open✓
2	Closed✓	Closes✓
3	Opens✓	Closed✓
4	Closes✓	Closed✓
5	Closed✓	Opens✓
6	Closed✓	Open✓

(6)

4.2



(3)

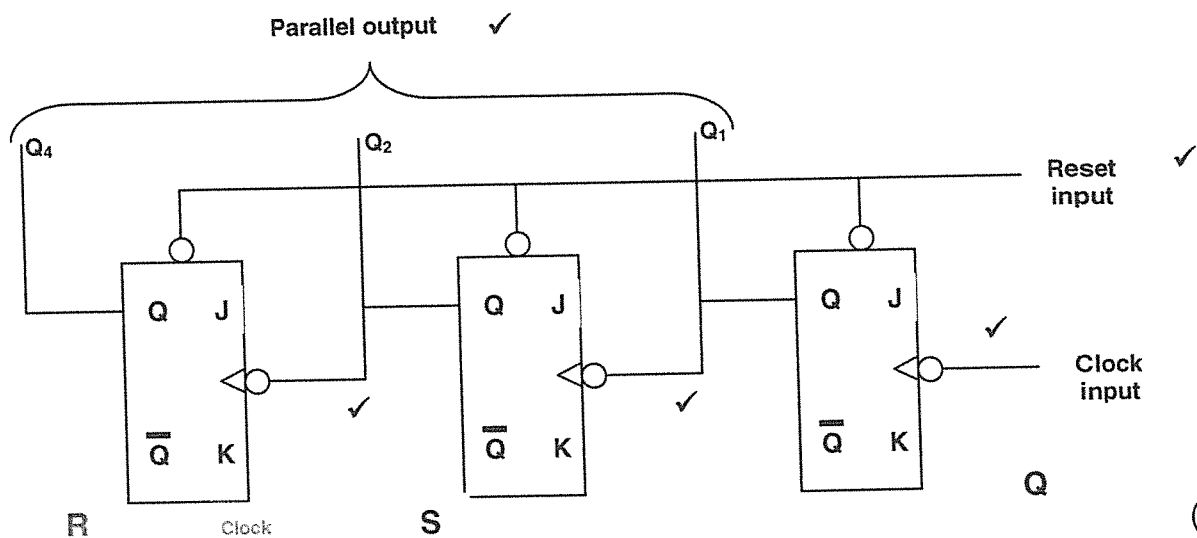
- 4.3 4.3.1 Read ✓ and Write ✓ (2)
- 4.3.2 SRAM ✓ and DRAM ✓ (2)
- 4.3.3 RAMs are called volatile memories because RAMs lose stored data when the power is turned OFF. ✓✓ (2)

[15]

QUESTION 5

- 5.1 A "register" is a collection of flip-flops or latches used to store a binary number; it is a one-word memory circuit. ✓✓ A shift register differs because it is a register that is used to shift binary words from one direction to another. ✓✓ (4)
- 5.2 Because an output of one flip-flop is a clock of the next one ✓✓ (2)
- 5.3 Serial-In, Serial-Out Shift Register ✓
 Serial-In, Parallel-Out Shift Register ✓
 Parallel-In, Serial-Out Shift Register ✓
 Parallel-In, Parallel-Out Shift Register ✓
 Bidirectional Shift Register (Any applicable 4 × 1) (4)

5.4



TOTAL SECTION B: 75
GRAND TOTAL: 100