



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N2

4 August 2025

This marking guideline consists of 6 pages.

QUESTION 1

- 1.1 1.1.1 I (Subtraction)
 1.1.2 G (Two flip-flops)
 1.1.3 E (Parallel)
 1.1.4 B (Decimal Numbers)
 1.1.5 A (OR Gate)

(5 × 1) (5)

- 1.2 1.2.1 10_{10}
 1.2.2 11001_2
 1.2.3 Subtraction
 1.2.4 100011_2
 1.2.5 110001_2
 1.2.6 30_{10}
 1.2.7 11110_2
 1.2.8 2_{10}
 1.2.9 11111
 1.2.10 Multiplication

(10 × 1) (10)

- 1.3 1.3.1 Half subtracter

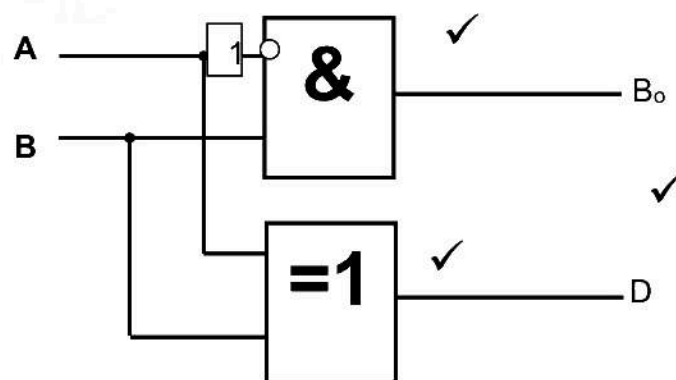
(1)

1.3.2

Inputs ✓		Outputs	
A	B	Dif✓	B _{out} ✓
0	0	0	0
0	1	1	1
1	0	1	0
1	1	0	0

(3)

- 1.3.3



(3)

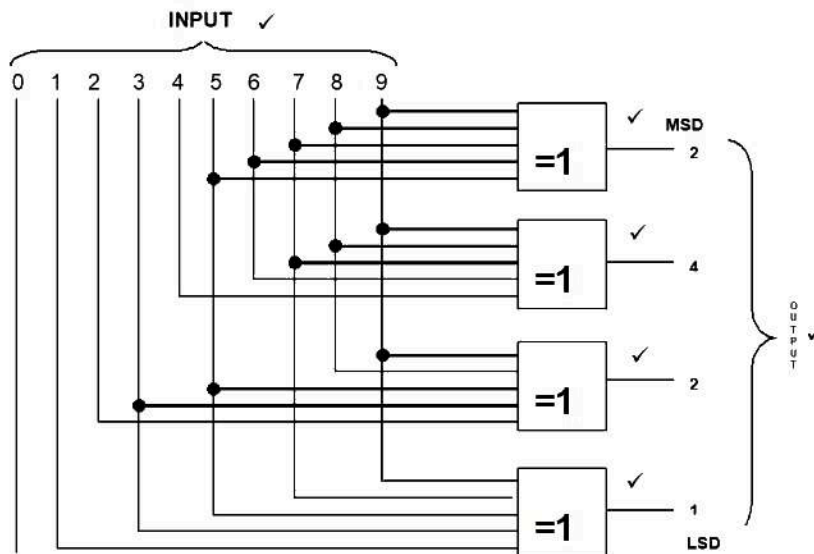
- 1.4 2421 code, ✓ 8421 code ✓ and XS3 code ✓

(3)

[25]

QUESTION 2

2.1



(6)

2.2 2.2.1 Encoder changes the decimal number to binary form, which is acceptable to the processor.

2.2.2 Decoder changes the binary number to a form which can be shown on the screen.

(2 × 2)

(4)

2.3 Weighted code is a code whereby the value of the position of every binary digit can be specified.

(2)

2.4 8421 BCD code OR 2421 BCD Code✓

(1)

2.5 2.5.1

6	4	7
2421	2421	2421
0110✓	0100✓	1101✓

175 = 11001001101_{2421BCD}✓

2.5.2

6	4	7
8421	8421	8421
0110✓	0100✓	0111✓

175 = 11001000111_{8421BCD}✓

2.5.3

6	4	7
+3	+3	+3
9	7	10
8421	8421	8421
1001✓	0111✓	1010✓

175 = 100101111010_{XS3CODE}✓

(4 × 3)

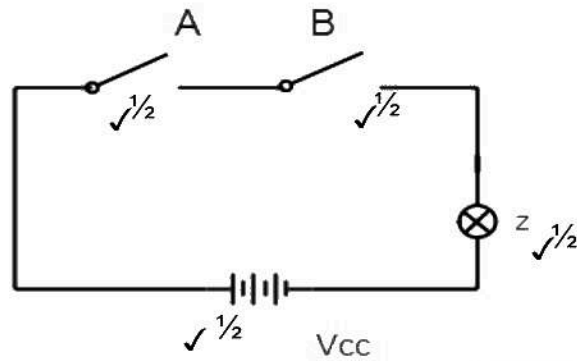
(12)

QUESTION 3

- 3.1
- Floppy disc
 - CD-ROM
 - Hard disc
 - Magnetic tape
 - Magnetic drum

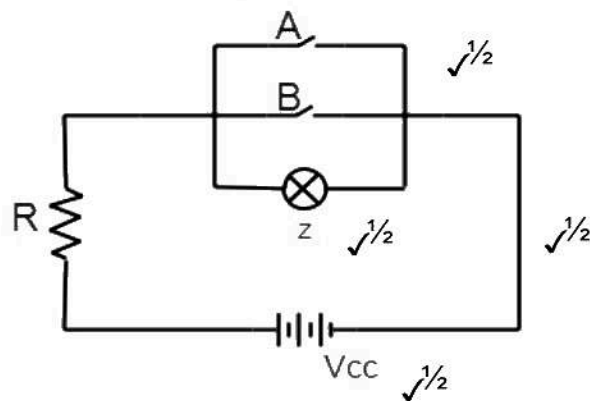
(5)

3.2 3.2.1



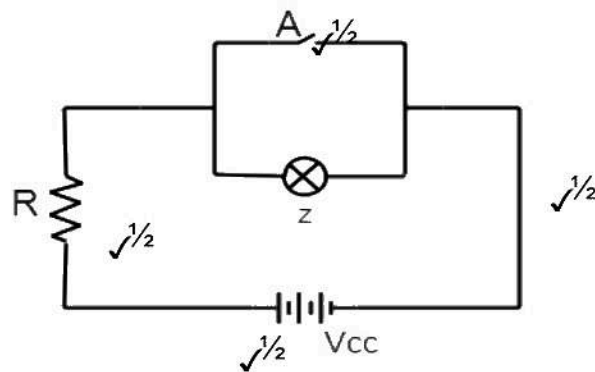
A	B	Z
0	0	0
0	1	0
1	0	0
1	1	1

3.2.2



A	B	Z
0	0	1
0	1	0
1	0	0
1	1	0

3.2.3



A	Z
0	1
1	0

(4 × 3) (12)

- 3.3
- Set input is synchronous input✓, which means it can set the Q output only when the clock is active.✓
 - Preset input is an asynchronous input✓, meaning that it can set the Q output regardless of any clock.✓

(4)

3.4 OR gates

(2)

3.5.1 NOR gate

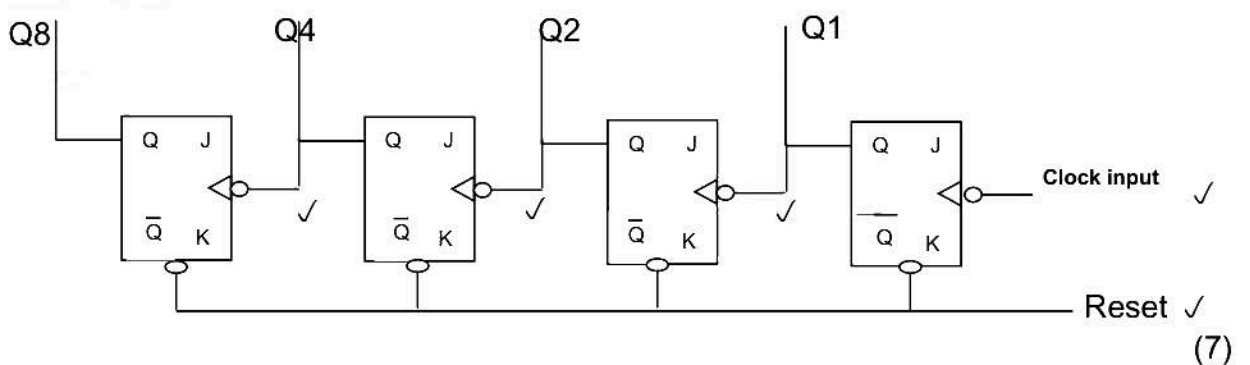
3.5.2 OR gate

(2 × 1) (2)
[25]

QUESTION 4

4.1

Parallel output ✓ ✓

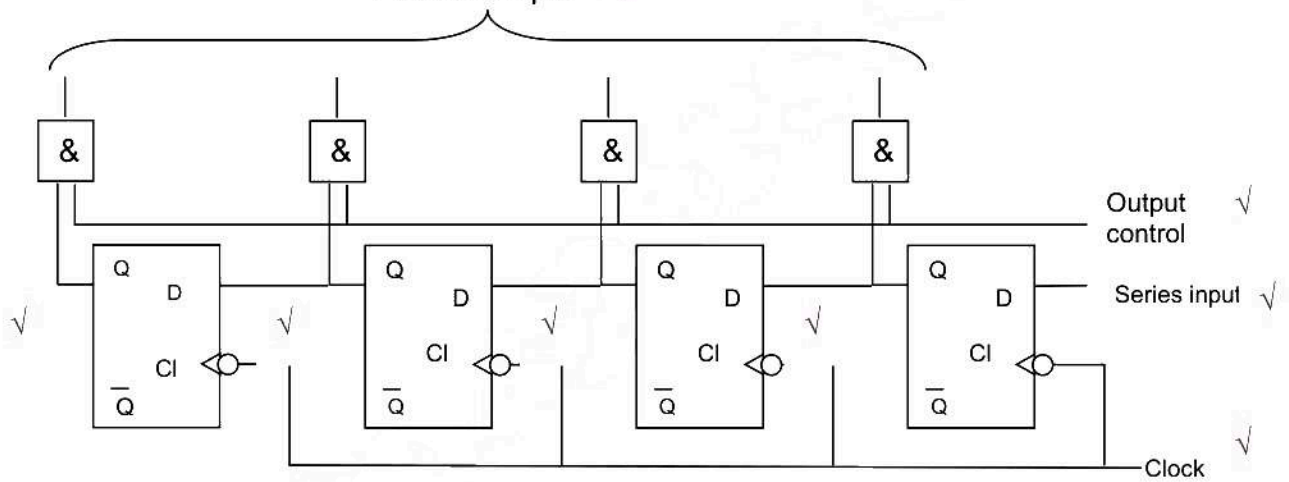


(7)

(Any 5 × 1) (5)

$$(5 \times 1) \quad (5)$$

Parallel output ✓



(8)
[25]

TOTAL: 100