



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

8 August 2025

This marking guideline consists of 6 pages.

QUESTION 1

A	B	C	J _A	K _A	J _B	K _B	J _C	K _C
0	0	0	0	∅	0	∅	1	∅
0	0	1	0	∅	1	∅	∅	0
0	1	1	1	∅	∅	0	∅	0
1	1	1	∅	0	∅	0	∅	1
1	1	0	∅	0	∅	1	0	∅
1	0	0	∅	1	0	∅	0	∅
0	1	0	0	∅	∅	1	0	∅
1	0	1	∅	1	0	∅	∅	1

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$Q_n \rightarrow Q_{n+1}$	J	K
$0 \rightarrow 0$	0	∅
$0 \rightarrow 1$	1	∅
$1 \rightarrow 0$	∅	1
$1 \rightarrow 1$	∅	0

	00	01	11	10
0	0	0	∅	∅
1	0	1	∅	∅

$$J_A = BC \quad \Lambda$$

	00	01	11	10
0	∅	∅	0	1
1	∅	∅	0	1

$$K_A = \neg B \quad \Lambda$$

	00	01	11	10
0	0	∅	∅	0
1	1	∅	∅	0

$$J_B = \neg AC \quad \Lambda$$

	00	01	11	10
0	∅	1	1	∅
1	∅	0	0	∅

$$K_B = \neg C \quad \Lambda$$

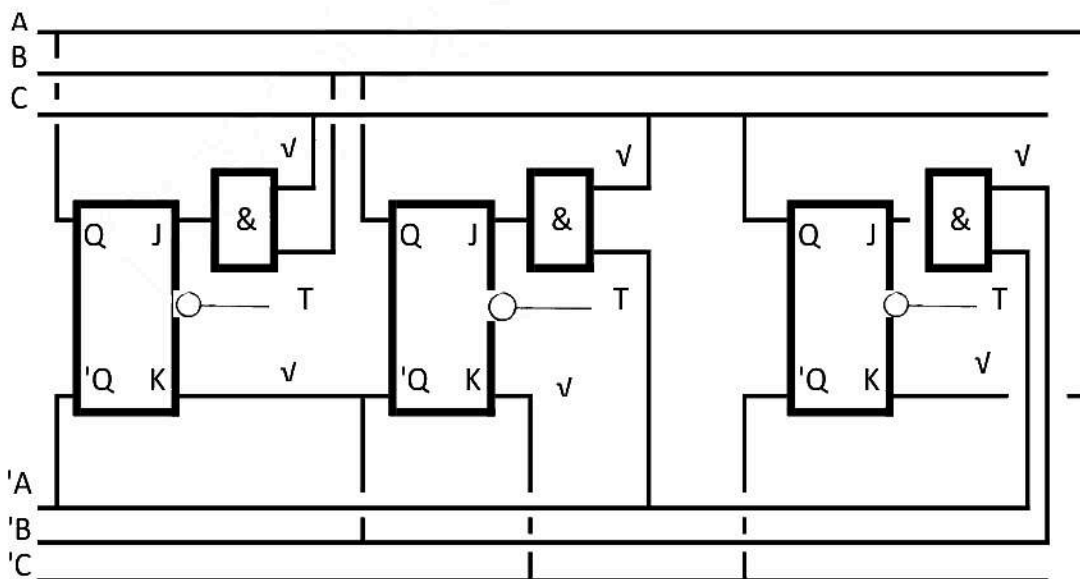
	00	01	11	10
0	1	0	0	0
1	∅	∅	∅	∅

$$J_C = \neg A/B \quad \Lambda$$

	00	01	11	10
0	∅	∅	∅	∅
1	0	0	1	1

$$K_C = A \quad \Lambda$$

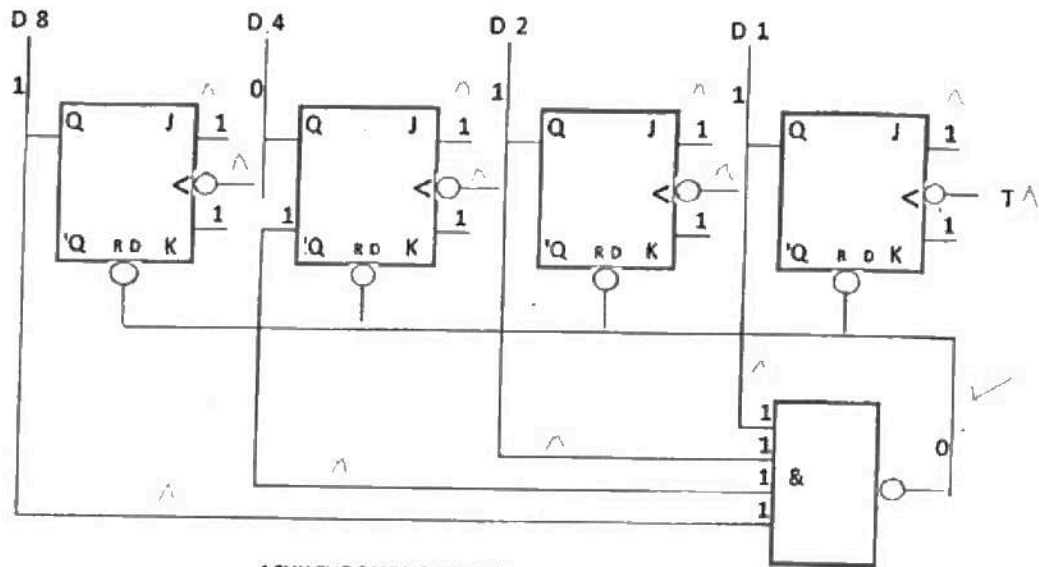
(7)



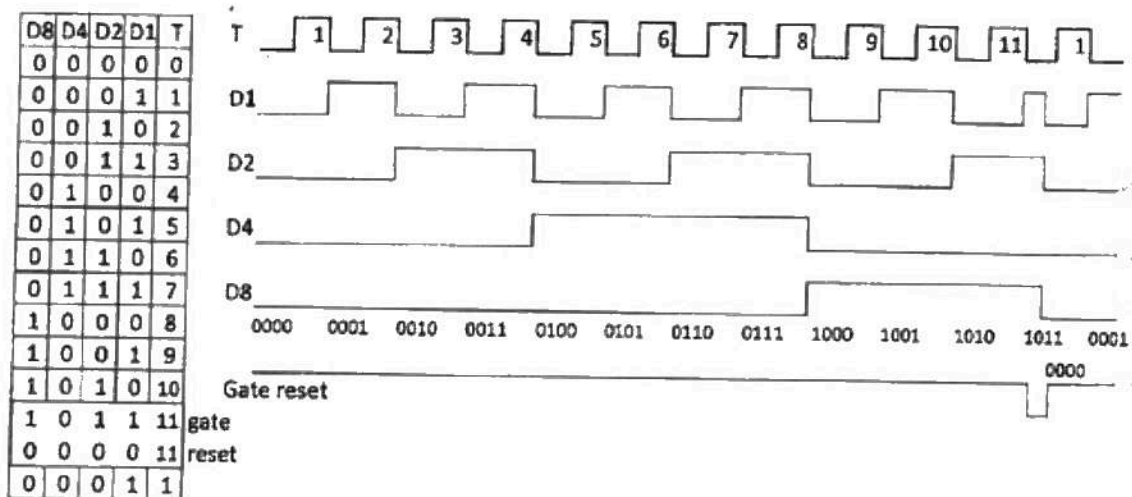
(8)

[15]

QUESTION 2



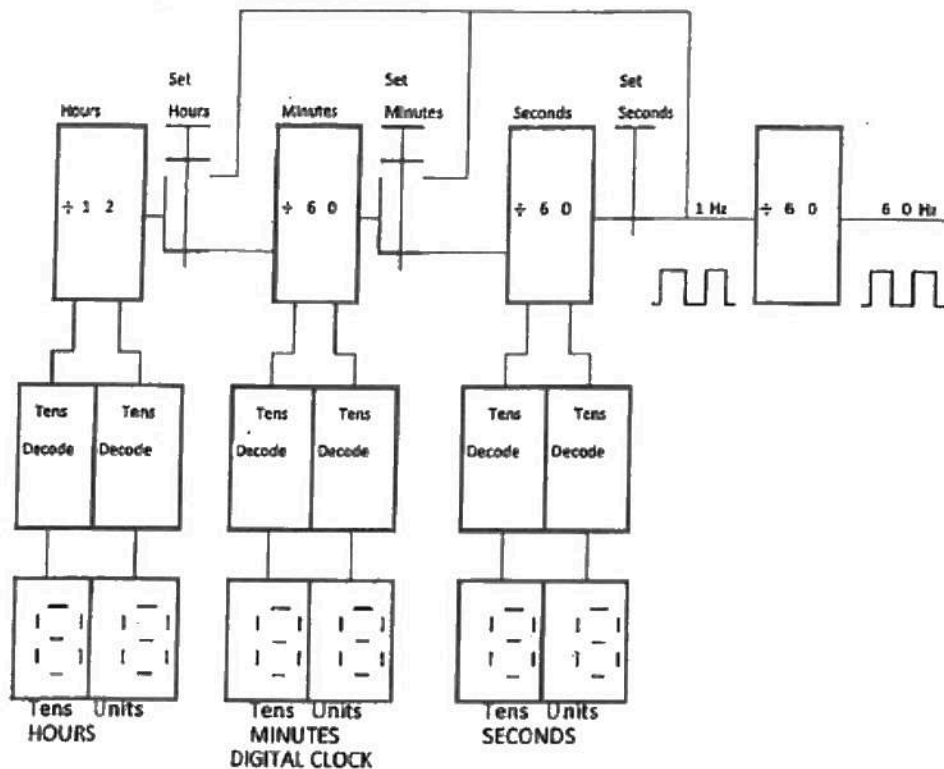
ASYNCHRONOUS UP COUNTER
WITH GATED RESET ON COUNT OF 1011



[15]

QUESTION 3

3.1



(10)

3.2

- The seconds counter counts the 1 Hz pulses and resets every 60 seconds.
- Counted seconds are displayed on the seconds segment display.
- The minutes counter counts the seconds output pulses and resets every 60 minutes.
- Minutes are displayed on the minutes segment display.
- The divide-by-12-counter counts the minute output pulses and resets every 12 hours.
- The switches for the set seconds, set minutes and set hours are used to set the correct time.

(Any 5 × 1)

(5)

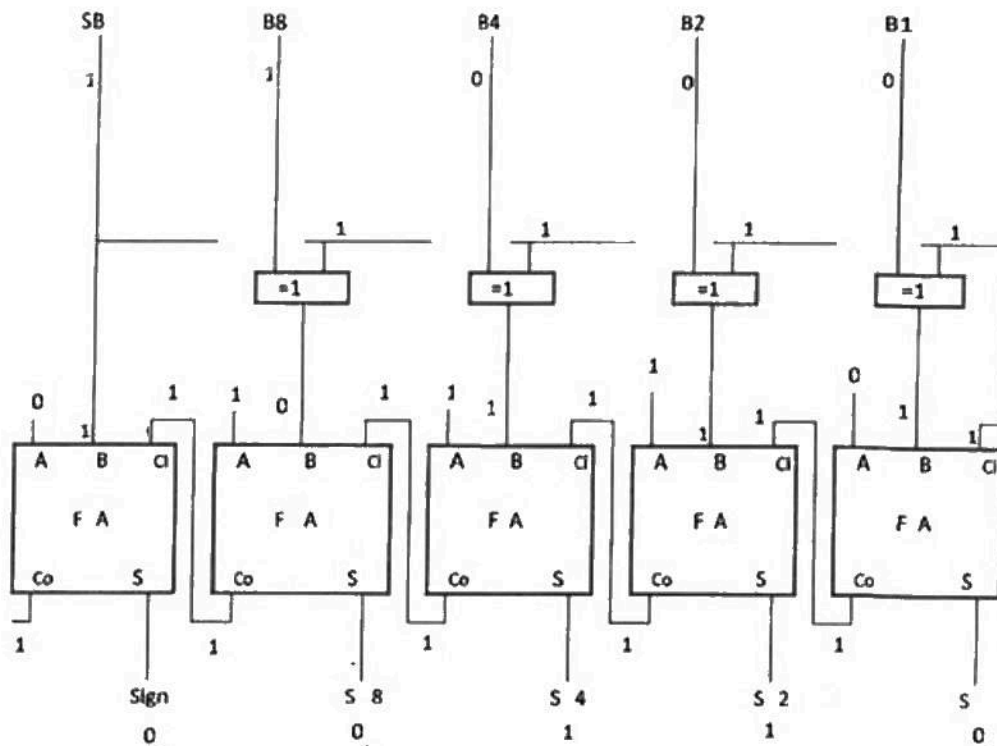
[15]

QUESTION 4

- 4.1 Selects
- 4.2 Multiplexer
- 4.3 Increase
- 4.4 Network
- 4.5 Data selector
- 4.6 Share
- 4.7 Device
- 4.8 Data
- 4.9 De-multiplexer
- 4.10 Switch
- 4.11 Multiplexer
- 4.12 Channel
- 4.13 Transmission
- 4.14 Ring
- 4.15 Sequencer

(Any relevant answer) [15]

QUESTION 5



½ mark SB and SA inputs

½ mark A and B inputs

1 mark for Full adders and exclusive OR gates connected correctly

½ mark on all logic 1s and 0s on the inputs of F/A, 1 mark for sum

[15]

QUESTION 6

- | | | |
|-----|-------------------------------------|-------------|
| 6.1 | Hard disk | (1) |
| 6.2 | RAM | (1) |
| 6.3 | Flash memory
Hard disk | (2) |
| 6.4 | RAM | (1) |
| 6.5 | CD-ROM
Hard disk
Flash memory | (3) |
| 6.6 | Hard disk
Stiffy drive | (2) |
| | | [10] |

QUESTION 7

- 7.1 Chain printer: Paper moved vertically in front of a moving chain consisting of raised characters. When the desired character passes its print position, the hammer in that position is driven against the ink type ribbon and the paper and the character is printed on the paper. ✓✓✓✓✓
- 7.2 Dot matrix printer: It has a print head that runs back and forth or in an up and down motion on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter. However, unlike a typewriter or a daisy wheel printer, letters are drawn out of a dot matrix and thus varied fonts and arbitrary graphics can be produced. ✓✓✓✓✓
- 7.3 Ink jet printer: These printers produce a fine, high velocity stream of ink which is deflected electrically in a vertical and horizontal direction to form characters on the paper. The stream is generally deflected by passing the ink stream through an electrostatic field such as that used in an oscilloscope. ✓✓✓✓✓
- 7.4 Laser printer: A laser beam projects an image of the page to be printed onto an electrically charged rotating drum coated with selenium. Photoconductivity removes the charge from areas exposed to light. Dry ink (toner) particles are then electrostatically picked up by the drum's charged areas. The drum then prints the image onto paper by direct contact and heat, which fuses the ink to the paper.

(Any 3 × 5) **[15]**

TOTAL: 100