higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T890**(E)**(A7)T

APRIL EXAMINATION

NATIONAL CERTIFICATE

LOGIC SYSTEMS N5

(8080295)

7 April 2016 (X-Paper)
9:00–12:00

This question paper consists of 5 pages.

Copyright reserved

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
LOGIC SYSTEMS N5
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Write neatly and legibly.

Tec

Copyright reserved

QUESTION 1

Telkom needs a synchronous binary counter for a new telephone system.

Design a counter that will deliver the following binary states:

1111_2
1110_2
1101_2
1100_2
1011_2
1010_2
1001_2
1000_2
0111_2
0110_2
0101_2
0100_2

The counter must be self-starting and must exit from any unused state to starting state within one clock pulse.

Design and draw the circuit diagram which consists only of JK master/slave flip-flops. **[15]**

QUESTION 2

Design a binary counter which will count the following decimal states:

15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5 and 4.

The counter must be an asynchronous module-12 counter.

Use JK master/slave flip-flops and show the truth table and waveforms for your counter. **[15]**

QUESTION 3

Draw the circuit diagram of a four-bit parallel-serial shift-out right register.

Indicate the following in the diagram:

- Parallel input
- Serial output
- Parallel input control **[10]**

Copyright reserved

QUESTION 4

4.1 Draw a circuit making use of 4 JK flip-flops that will deliver the following binary count. At switch-on the counter must start automatically with 0000_2.

A	B	C	D
0	0	0	0
1	0	0	0
1	1	0	0
1	1	1	0
1	1	1	1
0	1	1	1
0	0	1	1
0	0	0	1

(5)

4.2 Draw the clock input and the four output waveforms of the counter in QUESTION 4.1. (5)
[10]

QUESTION 5

5.1 Draw the block diagram of a parallel adder. (5)

5.2 Explain how the parallel adder in QUESTION 5.1 will add the numbers 7 and 13. (5)
[10]

QUESTION 6

6.1 Draw the circuit diagram of a static MOS memory cell. (10)

6.2 Draw the circuit diagram of a dynamic MOS memory cell. (10)
[20]

Copyright reserved

QUESTION 7

7.1 Name THREE impact printers. (3)

7.2 Name THREE non-impact printers. (3)

7.3 Give the difference between a *thermal printer* and a s*tatic printer*. (4)

7.4 Refer to the following printers and answer the questions below:

- Laser printer
- Inkjet printer

7.4.1 Indicate which printer will print the highest number of pages per minute.

7.4.2 Indicate which printer will print the lowest number of pages per minute.

7.4.3 Indicate the printer with the lowest running cost.

7.4.4 Indicate the printer with the lowest purchase price.

7.4.5 Can both printers print in colour?

(5 × 2) (10)
[20]

TOTAL: 100

Copyright reserved