

T840(E)(A6)T

AUGUST EXAMINATION

NATIONAL CERTIFICATE

LOGIC SYSTEMS N2

(8080262)

6 August 2014 (Y-Paper)

13:00–16:00

Calculators may NOT be used.

This question paper consists of 6 pages.

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.
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D S-R flip-flop

1.1.2

A NOT gate added to an AND gate will give a/an:

- A NOR gate
- B NAND gate
- C OR gate
- D AND gate

1.1.3

1001 is the binary number for decimal:

- A Eleven
- B Nine
- C Six
- D Three

1.1.4

A four-bit shift register will store decimal numbers up to:

- A Four
- B Eight
- C Ten
- D Fifteen

1.1.5

An output of full adder is in the form of :

- A Sum and carry
- B Carry
- C Sum
- D Difference

(5 x 1) (5)

1.2.5 A D-type flip-flop is constructed by connecting an inverter between the set and the clock terminals.

(5 × 1)

(5)
[10]

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 Give FOUR binary multiplication rules. (4)

2.2 Calculate the following numbers in binary number systems and convert the final answer to a decimal number system:

2.2.1 $10101 + 100010 + 1101$ (4)

2.2.2 $110010 \div 1010$ (4)

2.3 Convert each of the following decimal numbers to their binary equivalents and then complete the calculations in the binary number system:

2.3.1 $47 - 24$ (4)

2.3.2 11×14 (6)

2.4 Draw a fully labelled logic circuit diagram of a half subtractor making use of AND, XOR and NOT gates, and also draw its IEC symbol. (7)

2.5 Convert the following numbers to the code as indicated:

2.5.1 196 decimal to its 2421 BCD code. (3)

2.5.2 110010010110 XS3 to its decimal equivalent. (3)

2.6 Draw the truth table of an 8421 decoder. (5)
[40]

3.1.1 Name the gates represented by output X, Y and Z. (3)

3.1.2 Draw the IEC symbol for the gate represented by output Y. (3)

3.1.3 Draw the switch circuit for the gate represented by output X. (4)

3.1.4 Define the gate represented by output Z. (2)

3.2 Study FIGURE 1 below and answer the questions:

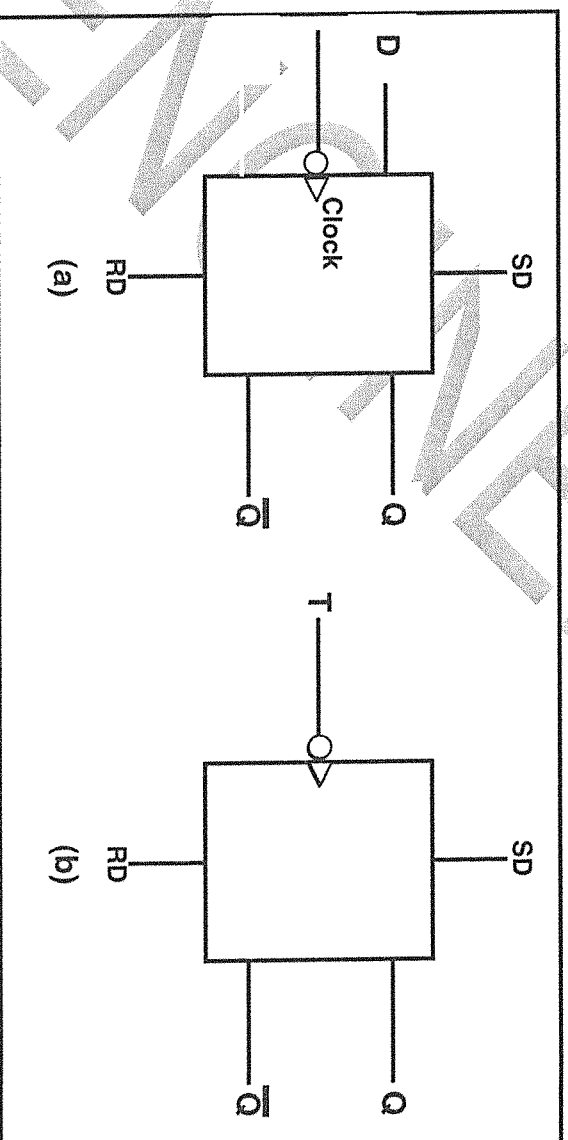


FIGURE 1

3.2.1 What types of flip-flops are represented by the two IEC symbols in FIGURE 1 above? (2)

3.2.2 Draw the truth table for the flip-flop in FIGURE 1(a) above. (2)

3.2.3 What is the meaning of the circle and triangle on the clock input of the flip-flop in FIGURE 1(a) or FIGURE 1(b) above? (4)

3.3 Draw a labelled hysteresis loop. (5)

[25]

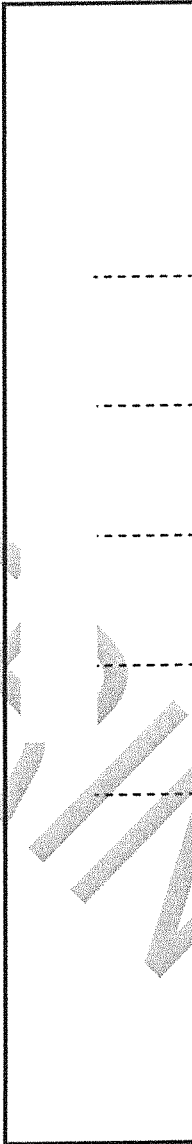


FIGURE 2

- 4.2 Draw a fully labelled circuit diagram of a shift register using D-type flip-flops with the following features: series input, series output. (6)
- 4.3 What is an asynchronous counter? (2)
- 4.4 Draw a neat labelled circuit diagram of an asynchronous binary-down single JK-type flip-flop, and also draw its truth table. (11)
[25]

TOTAL SECTION B: 90

GRAND TOTAL: 100