



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE DIGITAL ELECTRONICS N5

(8080365)

**19 November 2020 (X-paper)
09:00–12:00**

This question paper consists of 6 pages.

155Q1E2019

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
DIGITAL ELECTRONICS N5
TIME: 3 HOURS
MARKS: 150

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. Start each section on a new page.
 5. Use only blue or black ink.
 6. All calculations and answers must be given in three fractional radix spaces, for example $10,011_2$.
 7. Write neatly and legibly.
-

QUESTION 1

Convert the following numbers to their binary equivalent and follow the instructions given in brackets to complete the calculation in the binary number system:

- 1.1 $E6, F_{16} \div 43, 5_8$ (convert the answer to hexadecimal) (6)
 - 1.2 $96, E_{16} \times 53, 2_8$ (convert the answer to octal) (6)
 - 1.3 $122, 3_8 - 122, B_{16}$ (use two's complement to convert the answer to decimal) (6)
- [18]**

QUESTION 2

Design a synchronous binary counter that can count from 0 to 9 ($0000_2 - 1001_2$). Use J-K a flip-flop only and draw the circuit.

Show ALL the steps leading to the solution.

[23]

QUESTION 3

- 3.1 Draw a two-input complementary CMOS NAND gate. Show the input and output connections. (6)
- 3.2 Study FIGURE below and answer the questions.

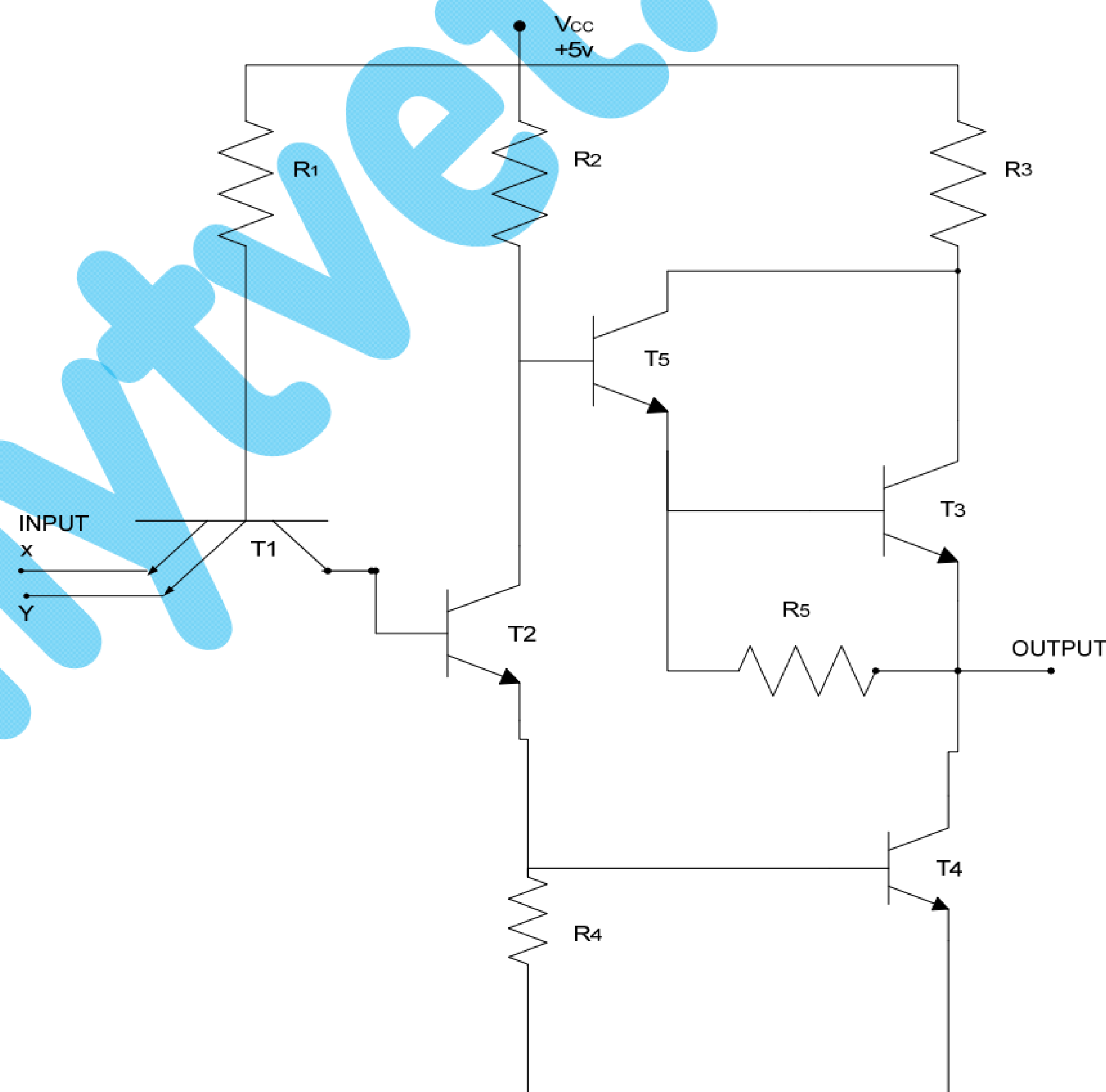


FIGURE 1