higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T470**(E)**(A1)T

NATIONAL CERTIFICATE

DIGITAL ELECTRONICS N5

(8080365)

1 August 2018 (X-Paper)
09:00–12:00

This question paper consists of 4 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
DIGITAL ELECTRONICS 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. Calculation processes and calculated answers must be given in THREE fractional radix spaces, for example 10, 101_2.
5. Work neatly.

QUESTION 1

Convert each of the following numbers to their binary equivalents and complete the calculation in the binary number system (follow the instruction in bracket):

1.1 $21,5_{10} - A1,C_{16}$

Use 2's compliment and convert the answer to hexadecimal.

1.2 $11,2_8 \times 10,2_{10}$

Convert the answer to hexadecimal.

1.3 $A4,C_{16} \div 123,5_8$

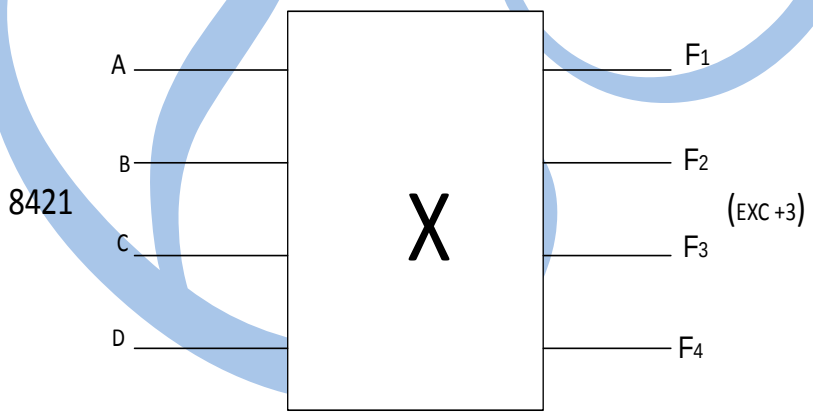
Convert the answer to octal.

(3 × 6) **[18]**

QUESTION 2

2.1 Draw a circuit diagram of a 4-bit binary-to-Gray decoder, indicating the output if a code of 1010_2 is applied at the input. (5)

2.2 Design a BCD to EXC +3 code converter.



(19)
[24]

QUESTION 3

3.1 Define the following terms with reference to TTL circuits.

3.1.1 Noise immunity

3.1.2 Propagation delay

3.1.3 Fan in

(3 × 2) (6)

3.2 Make THREE sketches to show THREE methods of connecting the unused input of a TTL. (9)
[15]

QUESTION 4

4.1 Differentiate between each of the following memories:

4.1.1 RAM and ROM

4.1.2 EPROM and EEPROM

(2 × 4) (8)

4.2 Sketch a bipolar transistor memory cell. (8)
[16]

QUESTION 5

5.1 Sketch a contact bounce that employs an SR latch. (3)

5.2 Name TWO disadvantages of an electrothermal printer. (2)

5.3 Give FOUR examples of impact printers. (4)
[9]

QUESTION 6

6.1 Determine the output voltage if the input voltage = 2 V, time = 2m/s, R = 10 kΩ, C = 10 µf and the digital code A = 2424. (2)

6.2 Draw a circuit of a digital-to-analogue converter which functions where digital codes can be fed in serial format. (5)

6.3 Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (6.3.1–6.3.2) in the ANSWER BOOK.

6.3.1 The reciprocal is the number of discrete steps in the output signal or the number of bits that are converted.

6.3.2 Resolution is the minimum and maximum voltage levels which determine a logic state.

(2 × 1) (2)
[9]

QUESTION 7

7.1 Draw a circuit diagram of a C-MOS inverter. (4)

7.2 Briefly describe the function of a URAT. (4)

7.3 For what is a modem used? (1)
[9]

TOTAL: 100