SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

## Higher National Diploma in Information Technology

### First Year, First Semester Examination – 2017

### HNDIT1104-Data Representation and Organization

Instructions for Candidates:
Answer Only **Four** questions
All questions carry equal marks.
**Calculators are not permitted.**

No. of questions : 05
No. of pages : 03
Time : **Two hours**

Q1

i. List the differences between **Data** and **Information.** (02 Marks)

ii. Define the following units. (04 Marks)
   a. Bit
   b. Byte
   c. Nibble
   d. word

iii. Non Positional Number Systems are also known as Non Weighted Number Systems. Give three examples for it. (03 Marks)

iv. Write the following numbers as sum of products using appropriate weights. (04 Marks)
   a. $25.56_{10}$
   b. $B0_{16}$

v. Convert the following decimal numbers into equivalent binary, octal and hexadecimal numbers (03*04=12 Marks)
   a. 41
   b. 132.45
   c. 2701
   d. 33.333

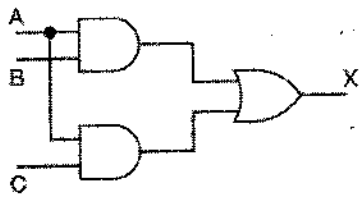
**(Total 25 marks)**

Q2

i. Define "Logic Gate" and "Logic Circuit"? (02 Marks)

ii. Express the main three (03) logic gates with their Boolean expression, Logic diagram symbol and appropriate truth table. (03*03=09 marks)

iii. Consider the given Logic Circuit




a. Obtain the Boolean Expression using the variables given. (05 Marks)
b. Draw the appropriate truth table (05 Marks)

iv. By considering the following Boolean Expression, draw its equivalent Logic Circuit. (04 Marks)

$$XY + \bar{X}Y.Z$$

**(Total 25 Marks)**

Q3

i. Convert each of the given binary numbers into Octal, Decimal and Hexadecimal numbers. (03*03=09 Marks)
   a. 01011010
   b. 111110
   c. 00110011

ii. Convert the following octal numbers into decimal numbers. (02*03=06 Marks)
   a. 345.1
   b. 107.05
   c. 0.243

iii. Convert the following hexadecimal numbers into decimal numbers. (01*02=02 Marks)
   a. A15
   b. 1FD

iv. Perform the following binary operations. (02*04=08 Marks)
   a. 00110011+011111110
   b. 10110110-10101001

c. 00011101*1010
d. 111011/11

**(Total 25 Marks)**

Q4.

i. Represent the following decimal numbers into sign magnitude format using 8 bits. (02*03=06 Marks)
   a. -28
   b. +123
   c. -101

ii. By taking 1's complement method into account, perform the following calculations on given decimal numbers using 8 bits. (02*03=06 Marks)
   a. -79+124
   b. -23+22
   c. +110-11

iii. Convert the following 2's complement binary numbers into decimal format. (02*02=04 Marks)
   a. 11100011
   b. 00011010

iv. Convert to Binary and then perform the **binary operations** on the following numbers.
   a. $231_{10} + 47_{10}$
   b. $130_8+101_8$
   c. $CE_{16}$-$IF_{16}$ (03*03=09 Marks)

**(Total 25 Marks)**

Q5.

i. Briefly explain "ASCII" and "EBCDIC" codes. ( 04 Marks)

ii. Convert the following Decimal numbers into BCD 4 bits code. (03*03=09 Marks)
   a. 501
   b. 972
   c. 9730

iii. Express the word "**org**" using ASCII format. (hint ASCII value of a is 97) (06 Marks)

iv. Display 10.375 using IEEE single – precision floating point format. (06 Marks)

**(Total 25 Marks)**