NATIONAL INSTITUTE OF PUBLIC ADMINISTRATION

BACHELOR OF COMPUTER SCIENCE

FIRST YEAR (FIRST SEMESTER)

BSC 102- INTRODUCTION TO COMPUTER SCIENCE

JUNE 2018 EXAMINATION

TIME ALLOWED: THREE HOURS

INSTRUCTIONS TO CANDIDATE:

1. 1. This paper contains **FIVE** questions.

   Answer any **THREE FULL** questions.

2. Number each answer clearly in the left margin along with the sub question number.
3. Draw the diagram whenever required.
4. Write the base or radix for the number system.
5. Start each answer on a new page.
6. Total marks: 60%.

DO NOT TURN THIS PAPER UNTIL TOLD TO DO SO

PLEASE LEAVE THE ANSWER SCRIPT BEHIND AFTER THE EXAMINATION

QUESTION 1:

a) Briefly explain the iterative operations with general format, example and flowchart. (7 Marks)

b) Write the truth table, graphical symbol and Boolean equation of AND gate, OR gate and NOT gate (6 Marks)

c) What is the function of full adder? (1 Mark)

d) Design full adder circuit. (6 Marks)

[Total = 20 marks]

QUESTION 2:

a) Differentiate between ASCII and UNICODE standards used in computer system. Also give example for each. (5 Marks)

b) Trace the decimal addition algorithm using the following input values (7 Marks)

$\mathbf{m = 3}$, $\mathbf{a_2 = 1}$, $\mathbf{a_1 = 4}$, $\mathbf{a_0 = 9}$

$\mathbf{b_2 = 0}$, $\mathbf{b_1 = 2}$, $\mathbf{b_0 = 9}$

c) Perform the following operations

i) Convert $(144.675)_{10}$ to binary (1.5 Marks)

ii) Convert $(11001.1010)_2$ to decimal (1.5 Marks)

iii) Assume that $a = 1$, $b = 2$, and $c = 2$. What is the truth value of each of the following Boolean expressions? (2 Marks)

1) $(a > 1)$ OR $(b = c)$ 2) $[(a + b) > c]$ AND $(b \leq c)$ 3) NOT $(a = 1)$

4) NOT $[(a = b)$ OR $(b = c)]$

d) What is Data Base Management System (DBMS)? (1 Mark)

e) With respect to DBMS, define tuple, attribute, primary key and foreign key. (2 Marks)

[Total = 20 marks]

QUESTION 3:

a) Design a three-to-eight decoder circuit. (7 Marks)

b) During the year 1975-1985 what major changes held in the size of computers as compared to previous generation of computers? (5 Marks)

c) Write binary search algorithm (6 Marks)

d) Find two's complement of $(-45)_{10}$ using 8 bits. (2 Marks)

[Total = 20 marks]

QUESTION 4:

a) Taking URL as an example and with the help of diagram explain how the interaction between client and server takes place. (10 Marks)

b) With the help of diagram explain the different steps of typical online transaction. (10 Marks)

[Total = 20 marks]

QUESTION 5:

a) With the aid of diagram explain the relationship between IP address and Port number in transport layer. (6 Marks)

b) Briefly explain the different threats to the security of network (6 Marks)

c) The function of logical link control in the data link layer is the error detection and correction. Though it is not possible to entirely eliminate errors, but it is possible to detect the error. Explain with example how ARQ algorithm does the error detection and correction.

(8 Marks)

[Total = 20 marks]