BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Wednesday 3rd April 2013 - Morning
Time: TWO hours

Section A and Section B each carry 50% of the marks. You are advised to spend about 1 hour on Section A (30 minutes per question) and 1 hour on Section B (12 minutes per question).

Answer the Section A questions you attempt in Answer Book A
Answer the Section B questions you attempt in Answer Book B

The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are **NOT** allowed in this examination.

SECTION A

Answer 2 questions (out of 4). Each question carries 30 marks.

A1 a) Computers generally process numeric data either as integers or floating-point numbers (floating-point numbers are sometimes called real numbers).

What is the difference between integers and floating-pointer numbers? Your answer should include the way in which the two number formats are represented, the range of values that can be represented, typical applications, and the relative advantages of the use of integer and floating-point numbers in computer applications?

(15 marks)

b) Why is it far harder (in terms of time and hardware complexity) to add two floating-point numbers together than it is to add two integers? Briefly describe how two floating-point numbers are added.

(10 marks)

c) The algebraic expression $X^2 – Y^2$ can be rewritten as (X + Y)(X – Y). For example, $9^2 - 7^2 = 81 - 49 = 32$, and (9 + 7)(9 - 7) = 16 x 2 = 32.

However, if X and Y are two floating-point values, these two calculations may yield different results. Why is this so, and under what circumstances does a difference between the two calculations arise?

(5 marks)

A2 The personal computer and small business computer have continually advanced over the years. For example, solid state disks are being introduced.

Discuss the way in which the PC has developed over the last five years and the way in which you believe it will develop over the next few years.

Your answer may include hardware, memory technologies, display technologies, the operating system, software, and connectivity such as the Internet.

(30 marks)

A3 a) Describe the features of a low-level language of your choosing. In order to do this you need to describe the target processor (in terms of registers), the type of operations that can be performed by the low-level language, and the format of instructions.

(25 marks)

b) What are the advantages and disadvantages of a low-level language?

(5 marks)

A4 a) Four people take part in electronic voting, A, B, C and D. Each has a button that provides a logical input to a circuit. The input is 0 (vote against) or 1 (vote for). Construct a truth table for a circuit to determine the majority vote. Note that A is the chair of the committee and, if the vote is evenly split, the chair's vote wins. Draw a truth table to represent all voting outcomes.

(10 marks)

b) From the truth table derive an expression for the output of the circuit in its most simplified form.

(8 marks)

c) Draw a circuit to implement the voting mechanism using AND, OR and NOT gates. .

(6 marks)

d) Draw a circuit to implement the voting mechanism using NAND gates only. .

(6 marks)

SECTION B

Answer 5 questions (out of 8). Each question carries 12 marks.

B5 Computers need to be protected and made more secure. Describe the following computer security terms:

a) Anti-virus software **(3 marks)**
b) Anti-spyware **(3 marks)**
c) Access Control List **(3 marks)**
d) Pop up blocker **(3 marks)**

B6 Describe the following network related terms:

a) Network Interface Card **(4 marks)**
b) Cat-5 **(4 marks)**
c) Bandwith **(4 marks)**

B7 The partial specification of a computer is as follows. In each case explain the meaning of the item in the specification

a) 1.7 GHz processor with 1.2 MB L2 cache memory **(3 marks)**
b) I TB hard disk at 5400 rpm **(3 marks)**
c) 1 VGA and 1 HDMI Video Interface **(3 marks)**
d) 802.11 built-in Wifi **(3 marks)**

B8 Provide a brief explanation of each of the protocols below:

a) TCP **(3 marks)**
b) POP **(3 marks)**
c) HTTP **(3 marks)**
d) SMTP **(3 marks)**

B9 There are different types of data storage available. For each of the storage mechanisms below, provide a brief description and give one typical use.

a) Hard disk **(4 marks)**
b) USB flash drive **(4 marks)**
c) DVD drive **(4 marks)**

B10 Operating systems provide computer users with various functions. Using an example of an operating system with which you are familiar, describe FOUR of its functions.

(3 marks for each function)

B11 Describe the purpose of each of the registers of a typical computer:

a) Program Counter **(4 marks)**
b) Memory Address Register **(4 marks)**
c) Accumulator **(4 marks)**

B12 Describe briefly the seven layers of the OSI Reference Model. **(12 marks)**