BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Tuesday 29th September 2015 - 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 <u>Section A</u> questions you attempt in <u>Answer Book A</u>
Answer the <u>Section B</u> questions you attempt in <u>Answer Book B</u>

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
All information inside a computer is represented in the form of strings of 1s and 0s.

There are many ways of representing **numeric values** in everyday life; for example,

Integer	123
Negative integer	-32
Fraction	0.123
Floating-point	1.124×10^{-6}

How is a computer able to represent each of these values in binary form? Explain the advantage and disadvantage of each system of numeric representation and its limitations. Your answer should include considerations such as word-length, accuracy, range, and the complexity of performing operations in each system. **(30 marks)**

A2
a) The inner (dot) product S of two vectors **A** and **B** is defined as $S = \sum a_i \cdot b_i$ for i = 0 to n-1; that is, $S = a_0 \cdot b_0 + a_1 \cdot b_1 + \ldots + a_{n-1} \cdot b_{n-1}$

Assuming that vectors **A** and **B** are located in main memory, write an assembly language program to calculate S. Note that a vector is a sequence of consecutive values; for example, $\mathbf{A} = a_0, a_1, a_2, \ldots, a_{n-1}$.

You may use any assembly language, although you must explain the action of each instruction you use. Your program should be documented. **(20 marks)**

b) Year by year, microprocessors have become faster and faster. Part of the increase in speed is due to advances in semiconductor manufacturing technology and part of the increase in speed is due to advances in **computer architecture and organization**.

Briefly explain **two** of the advances in computer architecture and organization that have significantly improved computer performance. **(10 marks)**

A3
Computer networks are associated with various types of hardware. A modern home or office may include the following items of hardware:

- Modem
- Hub
- Wi-Fi router

Explain what role each of these devices performs in a typical installation and why they are needed to provide safe networking facilities. **(30 marks)**

A4
a) Computer performance is regarded as important today; users want the best performance possible for the computers they buy.

Discuss the factors that contribute to the overall performance of a desk-top computer.

Explain how the performance of computers is measured today and how different computers are compared. Your answer should include several ways by which computer performance can be measured and you should comment on the accuracy/relevance of each of the measurement techniques. **(25 marks)**

b) Why has power dissipation (i.e., heat) become one of the principal limiting factors of modern computer performance? **(5 marks)**

SECTION B

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

B5
a) Briefly explain the role of TCP/IP in network management. **(4 marks)**
b) Describe the different layers of the TCP/IP model. **(8 marks)**

B6
a) Describe **THREE** security threats that computer users face today. **(3 x 2 marks)**
b) Give **THREE** measures that can be taken to deal with these threats. **(3 x 2 marks)**

B7 Describe the characteristics and typical uses of the following:

    a) VLAN **(6 marks)**
    b) Intranet **(6 marks)**

B8 Briefly describe the features and uses of the following:

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

B9 Briefly describe the features and uses of the following in the context of networking:

    a) RJ45 **(3 marks)**
    b) HDMI **(3 marks)**
    c) Fibre optics **(3 marks)**
    d) CAT5 **(3 marks)**

B10 What would an IT technician understand by the following terms:

    a) Bandwidth **(3 marks)**
    b) Ipconfig **(3 marks)**
    c) FAT32 **(3 marks)**
    d) Proxy server **(3 marks)**

B11

    a) Explain why a hierarchical file structure is needed in a computer system. **(6 marks)**
    b) Describe **THREE** file formats that might be used in a typical computer. **(3 x 2 marks)**

B12 Describe the key functions of a modern operating system. **(12 marks)**