BCS The Chartered Institute for IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Wednesday 29th September 2010 - 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 TWO questions out of FOUR in Answer Book A. Each question carries 30 marks

A1   A digital computer is said to have a memory hierarchy (i.e., it uses several forms of storage device/mechanism to hold data and each storage device has different characteristics).

a)   Explain why such a memory hierarchy exists.

(6 marks)

b)   Draw a diagram to represent the memory hierarchy you might expect to find in a typical high-performance personal computer. Start with the CPU's internal registers that sit at the top of the hierarchy.

(6 marks)

c)   Describe the characteristics (operating parameters, relative cost, and performance) of the elements of the memory hierarchy.

(18 marks)

A2   a)   An assembly language instruction may use one of several ***addressing modes*** to specify the operand. Explain the meaning of ***addressing mode*** and give examples of three different types of addressing mode.

(8 marks)

b)   A computer stores 16 eight-bit unsigned integers in memory sequentially starting at location 1000_{16}.

Write a program in assembly language to determine the largest integer in the list. When the program terminates the largest value should be stored in the location following the end of the list of 16 data elements. You may use any assembly language to write this program. However, you must (i) carefully explain what your program does and how it works, (ii) define what each of your instructions does, and (iii) fully document your code.

(**22 marks)**

A3 a) Peripherals such as printers can be connected to a computer by either a USB link or by means of wireless (WiFi). Briefly describe the characteristics of USB and WiFi links in the context of interfaces and comment on their suitability as a means of linking peripherals to a computer.

(15 marks)

 b) Describe any modern computer peripheral (excluding simple devices such as the keyboard and mouse). You must describe the principles of operation, and characteristics of the peripheral.

(15 marks)

A4 a) What are the fundamental differences between combinational logic elements (such as an AND gate), and sequential elements such as a flip-flop?

(6 marks)

 b) How are sequential logic elements used in a digital computer? Describe three roles they may perform in a digital computer.

(9 marks)

 c) Show, by means of a circuit diagram, how several flip-flops can be used to create a binary counter that counts from 0 to 7.

(9 marks)

 d) For the circuit you constructed in part (c) provide a timing diagram for your counter that shows how it counts up through the sequence 0,1, …7, 0, 1, 2, 3, …

(6 marks)

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

B5 a) Describe the various malware threats faced by computer users.

(6 marks)

 b) Recommend suitable measures to protect against these threats.

(6 marks)

B6 a) Describe the purpose of a router in a network.

(6 marks)

 b) Explain how you can configure a router to improve traffic flow in the network.

(6 marks)

B7 With reference to wireless computing, explain each of the terms below:

 a) Bluetooth technology

(6 marks)

 b) GPS

(6 marks)

B8 Many people would state that the most important software in a computer is its operating system.

 a) Using examples, briefly describe the main functions of an operating system.

(8 marks)

 b) Comment on recent developments in the field of operating systems.

(4 marks)

B9   a)   Explain the function of a web browser.

(6 marks)

        b)   What are the differences between HTML and HTTP?

(6 marks)

B10   Explain how and when each of the following storage devices are used.

        a)   Hard disc

(3 marks)

        b)   USB pen drive

(3 marks)

        c)   CD ROM

(3 marks)

        d)   Magnetic cartridge

(3 marks)

B11   Accessing the Internet can prove frustrating to some users because there are many
        hardware devices and software packages available. Write a short report outlining the
        issues to be addressed when you wish to access the Internet. Consider both the cases
        of the fixed base (home or office) user and the mobile user.

(12 marks)

B12   Briefly, explain the following processor related terms.

        a)   Instruction set

(4 marks)

        b)   Clock speed

(4 marks)

        c)   Bandwidth

(4 marks)