BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Thursday 29th March 2012 - 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) In the context of computer input/output, what is DMA and what are the advantages and disadvantages of using DMA?

(6 marks)

b) Explain what we mean by the expression *interrupt-driven I/O* and briefly explain what the advantages and disadvantages of interrupt-driven I//O are.

(6 marks)

c) Typical microprocessors like the Intel Pentium family and the 68K family use the system stack to support nested interrupts. What are nested interrupts and how is the stack used to support nested interrupts?

(6 marks)

d) Explain how an interrupt is received from a peripheral and then processed. You are required to use one or more diagrams in your explanation.

(12 marks)

A2. a) Low-level instructions can access data in either a memory location or a register. What are the advantages and disadvantages of using:

i)   a register to store data and
ii) a memory location to store data?

(2 x 3 marks)

b) Briefly describe the format of an assembly language instruction.

(4 marks)

c) What addressing modes are supported by typical low-level languages?

(6 marks)

Turn over]

d) A computer instruction has a 16-bit format and all instructions are 16 bits long. This machine implements instructions like ADD r1,r2,r3 where r1, r2, and r3 are registers. If the processor implements 16 different instructions, how many registers does the computer have?

(7 marks)

e) Forty years ago, programming computers in assembly language was quite common. Today, it is relatively rare. Why is assembly language an unpopular means of programming computers and why is it less popular today than 40 years ago?

(7 marks)

A3 a) Computers are constructed from two types of logic elements, gates and sequential elements (e.g., flip-flops). What are the characteristics of these two classes of element and why are two different types of element needed to construct a computer? Your answer should include a description of the basic gates and a description of the type of sequential circuits used in computers.

(12 marks)

b) A circuit has four natural binary encoded inputs D, C, B, A where D is the most-significant bit. These values represent 0 to 15 in decimal. It has a single output F.

F is 1 if the input on D, C, B, A is in the range 3 to 7 (inclusive) or 12 to 15 (inclusive).

Construct a truth table for this system.

(6 marks)

c) Obtain a simplified Boolean expression for F using any suitable technique.
(6 marks)

d) Construct a logic circuit for the above system using AND, OR, and NOT gates that will provide a 1 output if the input conditions are met.

(6 marks)

A4. The greatest problem facing both domestic and commercial computers is that of malware. Malware is a term that describes all programs that are intentionally designed to harm the computer user either directly or indirectly. SPAM is included in this category, although it is it is not a program.

Write an essay on the range of malware available and the type of problems created by the various types of malware. Your answer should include the dangers and effects of malware, the reason computers are vulnerable to malware, and a discussion of the things that the computer user can do to minimize both the dangers of malware and the consequences of malware.

(30 marks)

SECTION B

Answer FIVE questions out of EIGHT in Answer Book B. Each question carries 12 marks.

B5. The following programs are used to detect networking problems. Briefly describe how each program works.

a) Ping

(4 marks)

b) Traceroute

(4 marks)

c) Ipconfig

(4 marks)

B6. Memory management is vital in computer systems. Describe each of the following types of memory and explain how it is used.

a) Cache memory

(6 marks)

b) Virtual memory

(6 marks)

B7. Mobile networking has become very popular among computer users.

a) Explain what a WLAN is.

(4 marks)

b) Describe the wireless networking standards IEEE 802.11x

(8 marks)

B8. An operating system provides key functions to a computer system. Using suitable examples, explain the following operating systems related terms:

a) Graphical User Interface

(4 marks)

b) Mobile operating systems

(4 marks)

c) System Boot Process

(4 marks)

B9. a) Distinguish between the operation of a laser and an ink jet printer.

(8 marks)

b) Explain the factors which influence the choice between the above printers.

(4 marks)

B10. Differentiate between:

    a)   Hub

            (4 marks)

    b)   Switch

            (4 marks)

    c)   Router

            (4 marks)

B11. Data communications can be performed using different technologies. Describe the differences between PSTN and VoIP and explain why each of the technologies is used.

            (12 marks)

B12. Compare and contrast each of the following data storage devices. Explain how each is used.

    a)   RAM

            (3 marks)

    b)   USB drive

            (3 marks)

    c)   Magnetic Disk

            (3 marks)

    d)   Hard disk

            (3 marks)