BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Tuesday 23rd September 2014 - 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) in Answer Book A. Each question carries 30 marks.

A1 a) All contemporary computers provide an addressing mode that is called either **indirect addressing**, **pointer-based addressing**, **indexed addressing**, or **register indirect addressing** (the actual name of the addressing mode depends on the computer manufacturer).

Explain what this addressing mode means in plain English, and describe how it is used.

(6 marks)

b) Ten positive integers are stored in consecutive locations in a computer's memory beginning at memory location **`First`**.

Write an assembly language program to find the largest integer in this list. You may return the largest value in either a register or you may store it in memory.

You must explain the action of each instruction you use.

(24 marks)

A2 a) All digital systems are constructed from two types of component: combinational logic elements (i.e., gates) and sequential elements (i.e., flip flops). Describe the fundamental difference between these two circuit elements and explain why both types are needed to construct a computer.

(10 marks)

b) Show how flip-flops can be used to construct:

i) A counter. **(10 marks)**
ii) A shift register **(10 marks)**

A3 a) Explain the meaning of the term **interrupt** in the context of computer hardware and software.

(5 marks)

b) How are interrupts used to manage input/output transactions? Your answer should include one or more diagrams.

(15 marks)

c) In some ways an interrupt is similar to a subroutine call. In what ways are interrupts and subroutine calls similar and in what ways do they differ? This question requires only a brief answer.

(5 marks)

d) If interrupts did not exist, how would input and output operations be performed?

(5 marks)

A4 As a computer expert, you have been asked by a local university or college to give them advice concerning their computing needs over the next five years.

The university/college is considering whether to continue using conventional computers (at the moment they have several PC-based laboratories where most computers are 6 years old) and to upgrade the laboratories, or whether to change direction and use tablet-based computers (e.g., the iPad or Nexus 7).

What advice would you give them?

This question requires you to write a short report that discusses the merits of traditional PCs and tablets in a university/college department (and for home use by students). Your answer should take account of likely applications, peripheral usage, connectivity, memory requirements, and performance etc.

Your answer should also indicate whether the needs would be the same if the department were an arts department (e.g., languages or law) or if it were a computer science department.

(30 marks)

SECTION B

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

B5 Explain the meaning of each of the following items found in a computer specification:

a) Quad core processor **(2 marks)**
b) 2.6 GHz clock **(2 marks)**
c) 4 GB DRAM **(2 marks)**
d) 750 GB storage **(2 marks)**
e) 15.6” display **(2 marks)**
f) 4 x USB 3.0 ports **(2 marks)**

B6 Describe and explain the following types of computer networks. Explain how these are used by organisations.

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

B7 Computer files are stored in different formats. Describe each of the following file formats:

a) Executable file **(4 marks)**
b) Compressed file **(4 marks)**
c) Database file **(4 marks)**

B8 Describe the following operating system and network related terms:

a) Page-fault **(4 marks)**
b) Routing table **(4 marks)**
c) Hashing **(4 marks)**

B9 Describe and explain the use of the following storage devices:

a) Hard disk **(3 marks)**
b) USB drive **(3 marks)**
c) DVD **(3 marks)**
d) Magnetic tape **(3 marks)**

B10 Explain the following computer malware and give one measure that should be taken against each:

a) Virus **(3 marks)**
b) Worm **(3 marks)**
c) Trojan **(3 marks)**
d) Pop-up **(3 marks)**

B11 a) Explain how IP addressing is used in computer networking. **(6 marks)**
b) What do you understand by VoIP? How is it used? **(6 marks)**

B12 Describe the hardware, software and services needed to connect a desktop computer to the internet.

(12 marks)