

BCS THE CHARTERED INSTITUTE FOR IT
BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER & NETWORK TECHNOLOGY

Wednesday 28th September 2011 - 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 TWO questions out of FOUR in Answer Book A. Each question carries 30 marks.

- A1. Today's academics, business people, scientists, law-enforcement agents, and engineers rely very heavily on mobile computing; that is, the ability to use computers and access the internet and email remotely as they travel from place to place (often around the world).

The computing facilities (typically, a so-called laptop or notebook computer) used by such people are critical to them and their work.

Describe the security problems (in both hardware and software) with which such people must concern themselves and suggest possible solutions to these problems.

(30 marks)

- A2. Typical high-performance computers such as PCs do not have a single type of memory; they may use many different memory technologies (e.g., hard disk or DVD).

With the aid of diagrams, carefully explain why a computer has such a hierarchy of memory technologies and explain at least four different technologies. In each case, give the characteristics of the technology, its basic operational parameters, and its advantages and disadvantages in a PC. NOTE that this question is concerned with the various types of memory technology used by a computer and not with the operation of the computer at the register and bus level.

(30 marks)

Turn over]

- A3. a) As the cost of computer hardware decreases, the cost of software increases. Today, the cost of a personal computer's operating system can be an appreciable fraction of the cost of the computer. This state of affairs reflects the complexity of operating systems and the importance of their contribution to the computer system.

Explain why operating systems in high-performance personal computers are so important today, and describe how they contribute to the computer system.

Your answer should include a brief history of operating systems and a discussion of the facilities they offer today (including both the control aspects – filing systems and interface) and the user aspects (the user interface and user applications).

(23 marks)

- b) How do you think operating systems will develop in the next five to ten years (bearing in mind the progress in technology, interfaces, and the convergence of computer-based devices such as cellular phones, iPad-style systems, MP3 players, and electronic books)?

(7 marks)

- A4. a) The so-called Von Neumann stored-program computer operates in a fetch execute mode.

- i. What is the meaning of fetch/execute mode?

(6 marks)

- ii. What is the role of the program counter (instruction pointer) in a stored computer?

(6 marks)

- iii. The number in the program counter changes during the execution of a program. Explain why the contents of a program counter change and the circumstances under which the contents of the program counter change.

(6 marks)

- iv. Draw a diagram of the internal structure of a computer and use it to explain how a stored-program computer operates.

(6 marks)

- b) There are very many different types of microprocessor available today (some are used in toys, some in cellular phones, and some in PC). Briefly explain why there is such a wide range and state how they vary one from another.

(6 marks)

SECTION B

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

- B5. a) What is a MAC address? **(6 marks)**
- b) Why and how is IP addressing used in computer networks? **(6 marks)**
- B6. a) Briefly describe the key storage devices (internal and external) a typical personal computer user requires. **(6 marks)**
- b) Outline the factors to be considered when choosing a printing device. **(6 marks)**
- B7. a) Briefly explain the importance of the OSI model. **(6 marks)**
- b) Briefly explain the features of the Data Link Layer. **(6 marks)**
- B8. Explain how a router enables a computer network to function efficiently. **(12 marks)**
- B9 a) Differentiate between broadband and baseband communication. **(6 marks)**
- b) Briefly describe the Point-to-Point Protocol (PPP) **(6 marks)**
- B10. Operating systems serve different purposes in a computer system. Briefly explain each of the terms below
- a) Memory allocation **(3 marks)**
- b) Resource scheduling **(3 marks)**
- c) Interrupt management **(3 marks)**
- d) Print spooling **(3 marks)**
- B11. a) Describe the operation of a VLAN. **(8 marks)**
- b) Explain where and how VLAN is used. **(4 marks)**

Turn over]

B12. Briefly, explain the following processor related terms.

a) USB port

(4 marks)

b) Video Graphics Adaptor

(4 marks)

c) Shift register

(4 marks)