

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

COMPUTER & NETWORK TECHNOLOGY

Tuesday 29th March 2016 - 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). Each question carries 30 marks.

A1

- a) What is an operating system and why is it necessary? Your answer should include a discussion of the facilities that they provide. **Note that your answer need not be limited to mainframe/desktop computers but may extend to portable devices.** (20 marks)
- b) Using your knowledge of existing and past operating systems (e.g., Windows, MAC OS, Unix), what changes do you expect to see in the next few years? Your answer may include anticipated changes in technology, communications, and peripherals. (10 marks)

A2

- a) Why do computers use binary arithmetic, instead of the conventional base-10 arithmetic that people use? (3 marks)
- b) What is floating-point arithmetic and why is it necessary for scientific and engineering calculations? (5 marks)
- c) Explain how a floating-point number is stored in binary form. (5 marks)
- d) What steps are necessary to convert a number such as the decimal value 12.0012 into a binary floating-point value? You need only describe the steps – you do not have to perform any calculation. (7 marks)
- e) Why is floating-point addition far more complicated than integer addition? (5 marks)
- f) Operations on integer values normally yield an exact result with no error. Floating-point operations do not always yield an exact result and there is often a difference between the calculated result and the true result. Why is this so? (5 marks)

A3

A computer can use several different memory technologies such as *flash memory*, *DRAM*, *static RAM*, *magnetic memory*, and *optical storage* (DVD, Blu-ray).

- a) For each of the memory technologies in italics, briefly describe the technology in terms of its operating principles, give the typical characteristics of the memory technology, and explain that particular technology's role in a computer system. **(25 marks)**
- b) A computer makes 95% of its memory accesses to cache memory with an access time of 10 ns, it makes 4.9% of its accesses to DRAM with a 50 ns access time, and it makes 0.1% of its accesses to a disk drive with a 4 ms access time. What is the average memory access time? **(5 marks)**

A4

- a) Input/output devices have changed immeasurably over the decades. Write a short account of recent advances in computer input/output technology (that is, the I/O devices themselves and NOT the I/O strategies such as interrupts). You do not have to go into the details of a device's operation – a few words describing its basic principles are sufficient. In order to get full marks for this section you should describe at least four I/O devices. **(25 marks)**
- b) Explain how modern I/O devices have changed the face of modern computing. **(5 marks)**

SECTION B

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

B5

Explain each of the following terms of a typical computer specification.

- a) Dual core processor
b) 3 MB Cache
c) 1 TB HDD
d) 1366 x 768 screen resolution

(4 x 3 marks)

B6

- a) Briefly explain what is meant by 'Cyber security'. **(6 marks)**
b) Outline THREE methods to protect computer resources against cyber attacks. **(6 marks)**

B7

Describe and explain how each of the following can affect a computer's performance.

- a) Disc fragmentation
b) Updating/Upgrading software files
c) Encryption

(3 x 4 marks)

B8

Briefly explain each of the following networking terms:

- a) FTP
- b) SMTP
- c) POP
- d) DHCP

(4 x 3 marks)

B9

Describe and explain FOUR services offered by an Internet Service Provider (ISP).

(4 x 3 marks)

B10

- a) Explain each of the following:
 - i) Program Counter
 - ii) Memory Address Register
 - iii) Memory Buffer Register

(3 x 2 marks)

- b) Explain how each of the above registers is used in the Fetch Execute Cycle. **(6 marks)**

B11

Explain each of the following types of computer ports

- a) VGA
- b) USB
- c) Ethernet
- d) HDMI

(4 x 3 marks)

B12

Briefly describe the operation and use of the following:

- a) Wireless router
- b) Proxy server
- c) Repeater

(3 x 4 marks)