BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER AND NETWORK TECHNOLOGY

Tuesday 3rd October 2023 - 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).

The marks given in brackets are **indicative** of the weight given to each part of the question.

Answer any Section A questions you attempt in Answer Book A
Answer any Section B questions you attempt in Answer Book B

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.

Modern networks are usually based around a reference architecture or topology.

Explain **TWO** advantages and **TWO** disadvantages of **each** of the following network topologies (illustrating with a typical schematic for each):

      i.   Ring;
     ii.   Bus;
    iii.   Mesh;
    iv.   Star;
     v.   Tree.

(30 marks)

A2.

Computers continue to evolve over the period of time from Mainframes through to Tablets.

a) Explain the main differences between a mainframe computer and a supercomputer.
(6 marks)

b) Discuss and justify why a corporate bank may want to purchase a mainframe computer.
(6 marks)

c) Discuss and justify why a country's meteorological office might require the use of a supercomputer.
(6 marks)

d) Describe the main differences between a desktop and laptop computer.
(6 marks)

e) State what an embedded computer is and explain which advances in technology may benefit from this concept.
(6 marks)

B11.

For a desktop computer, give **SIX** Hardware Components that can be performance tested and suggest a suitable method of performance testing them.

(12 marks)

B12.

a) Describe, using a diagram to support your writing, the TCP/IP 7 Layer Model.

(9 marks)

b) State the layer of the TCP/IP Model that the below protocols function at:

    i.   ARP;
    ii.   TCP;
    iii. HTTP.

(3 marks)

END OF EXAMINATION

A3.

Operating systems and peripherals are key parts of all major computer systems.

a) Describe what **SIX** main roles of an operating system could be.

(12 marks)

b) Explain the use of biometric devices and justify which areas the use of biometric devices might fit into within an operating system.

(8 marks)

c) Compare and contrast the different alternative input devices that can be used for accessibility instead of the conventional keyboard and mouse used on desktop computers.

(10 marks)

A4.

Multi-tasking enables more than a single process to apparently execute simultaneously.

a) Convert the following Ip addresses to their binary equivalent.

    i.   192.168.1.111
    ii.   202.202.0.254
    iii. 10.11.12.224
    iv.   127.0.0.1

(8 marks)

b) Assuming using 16 bits for the floating point number, with 10 bits used for the mantissa and 6 for the exponent, calculate the following as binary floating point numbers.

    i.   5.23
    ii.   12.456
    iii. 6.123
    iv.   12.12
    v.   1.23

(10 marks)

c) Convert the following binary numbers to their Base 8, 10 and 16 equivalents.

    i.   10000001 11000011
    ii.   11110001 00110011
    iii. 00000011 10101011
    iv.   11100110 11001100

(12 marks)

[Turn over]

Section B
Answer 5 questions (out of 8) in Answer Book B. Each question carries 12 marks.

B5.

With an Input of A=1 and B=0, state if the output would be 0 or 1 and show the truth table for the output of the following gates:

    i.   OR;
    ii.   NAND;
    iii. NOR;
    iv. XNOR.

                                          (12 marks)

B6.

a) Describe, with an example, a Man-in-the-Middle attack.

                                          (3 marks)

b) Describe, with an example, a method of Network Scanning.

                                          (3 marks)

c) Consider the impact of migration to a cloud service. Suggest **THREE** effects it might have on the employees of a company.

                                          (6 marks)

B7.

a) Define **THREE** common types of printers and give an overview of how they function.

                                          (6 marks)

b) Given the below usage cases, give a recommendation with a justification of which printer technology would be most suitable:

    i.   High Resolution Photographs;
    ii.   High Volume Multipurpose printing;
    iii. Light home usage.

                                          (6 marks)

B8.

Virtual Memory is a core function of an Operating System's Memory Management.

a) Define Virtual Memory and give an overview of its functionality.

                                          (4 marks)

b) State what problem Virtual Memory is designed to alleviate.

                                          (1 mark)

c) On a Microsoft Windows based system, state how the default Virtual Memory value is calculated.

                                          (1 mark)

d) Give an example scenario and explain how reducing the provision of Virtual Memory to 0 may improve performance on a System.   **(6 marks)**

B9.

a) State the full expansion of the following abbreviations:

    i.   WEP;
    ii.   WPA3;
    iii. SSID.

                                          (3 marks)

b) Give an example where a Wireless Network with Open Security or Non-security might be used and why it would not be a security issue.

                                          (3 marks)

c) State the **TWO** 802.11 Wi-Fi Frequencies commonly used, and give an advantage and disadvantage for both.

                                          (6 marks)

B10.

a) Compared to a mechanical spinning platter drive, describe why a Solid State Drive has vastly improved seek performance.

                                          (3 marks)

b) Provide **THREE** considerations when planning suitable storage for a laptop.

                                          (3 marks)

c) State **THREE** connection interfaces for Storage Drives to be used to interface with the main device.

                                          (3 marks)

d) State how you would compare performance of Storage Mediums and how you would ensure that the testing is fair.

                                          (3 marks)

[Turn Over]