

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER AND NETWORK TECHNOLOGY

Tuesday 4th October 2022 – 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 any Section A questions you attempt in Answer Book A
Answer any 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.

Modern PC motherboards usually have an architecture based around a Northbridge and Southbridge chipset.

- a) Explain why the motherboard is divided into two distinct areas based around the Northbridge and Southbridge chipset and describe the typical motherboard components and buses one would expect to be associated with each?
(16 Marks)

- b) If a user were to purchase a new motherboard today, why are they not able to see the Northbridge chip? Explain why has this happened?
(9 Marks)

- c) The ISA bus system was no longer supported on motherboards after 1999. Why did this happen and why was it needed?
(5 marks)

A2.

Since humans use decimal notation and computers use binary notation, number conversion is of paramount importance to how computers represent numbers.

- a) Using the following numbers (show all your working):
 - i) 1356, show how a decimal number can be converted to binary.
 - ii) 1011100111, show how a different binary number can be converted to decimal.
(12 marks)

- b) Using the following numbers (show all your working without going via decimal):
 - i) 1011111000, show how a binary number can be converted to octal.
 - ii) 1110001111, show how a binary number can be converted to hexadecimal.
(12 marks)

- c) Explain why it is important that, when using the methods described in part (b), the conversion starts at the least significant bit?
(6 marks)

A3.

Modern 'peer coupled' and/or client/server network protocols such as Ethernet and TCP/IP are based on the ISO OSI reference model.

- a) With the aid of a diagram show how Ethernet and the layers of the TCP/IP model correspond to the ISO OSI model.

Which aspects of the TCP/IP protocol are left entirely to the application?

(12 marks)

- b) In the context of the ISO OSI model, explain what the term 'peer coupled' means and how this relates to the encapsulation of data.

(12 marks)

- c) Explain why might it be the case that the ISO OSI model is based on the behaviour of TCP/IP rather than TCP/IP on the ISO OSI model.

(6 marks)

A4.

Modern operating systems such as Unix and Linux are based on a kernel which controls user and system processes.

- a) Explain what is meant by the term 'kernel' in the context of an operating system?

(5 marks)

- b) As a server-based operating system Linux has special processes called daemons. Describe what a daemon process is and how it differs from a standard user process.

(10 marks)

- c) If the configuration file of a Linux daemon process is changed, why will the 'process' not necessarily know about the change until a reboot? Explain how a user can get it to recognise the change without rebooting.

(10 marks)

- d) Explain what the significance of the Linux directory `/etc/rc.d/` is to a daemon process. Why does a user need root privileges to change its contents?

(5 marks)

[Turn Over]

Section B

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

- B5.**
- a) Describe the purpose of communication protocols. **(6 marks)**
 - b) Describe the function of DHCP. **(3 Marks)**
 - c) Describe an alternative to DHCP service. **(3 Marks)**
- B6.** Explain with the help of diagrams:
- a) What is a multi-core processor and how it works. **(6 marks)**
 - b) How a multicore processor improves performance. **(6 marks)**
- B7.**
- a) Explain what is meant by Network Performance Monitoring. **(6 marks)**
 - b) Explain the purpose of Wide Area Networks. **(6 marks)**
- B8.** Answer the following questions and show your working:
- a) Convert 192.168 to hexadecimal and binary. **(6 marks)**
 - b) Convert 11010101 and 10101001 to decimal and hexadecimal. **(6 marks)**
- B9.** Describe the function of the following terms:
- a) SSL **(4 marks)**
 - b) HTTPS **(4 marks)**
 - c) FTPS. **(4 marks)**
- B10.**
- a) Explain **THREE** advantages and **THREE** disadvantages of laser printers in comparison with ink jet printers. **(6 marks)**
 - b) Describe the operating principles of both types of printers. **(6 marks)**

- B11.**
- a) Describe **THREE** functions of antivirus software. **(6 marks)**
 - b) Describe **THREE** different types of cyber threat. **(6 marks)**
- B12.**
- a) Describe **THREE** characteristics of biometric security systems. **(6 marks)**
 - b) Describe **THREE** disadvantages of biometric systems. **(6 marks)**

End of Examination