BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 4 Certificate in IT

COMPUTER AND NETWORK TECHNOLOGY

Thursday 18th April 2024 - 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.
B9. 
   a) State the seven Layers of the OSI Model. (7 marks)
   b) State the four Layers of the TCP/IP Model. (4 marks)
   c) Give an example protocol and the layer of the OSI Model it relates to. (1 mark)

B10. 
   a) Explain, using examples, the differences between a baseline and benchmarking. (6 marks)
   b) Describe a suitable testing method for network throughput and provide a suitable unit of measurement. (3 marks)
   c) Describe what IOPS are used to measure and the significance of the measurement. (3 marks)

B11. 
   a) Describe the function of a router within a network. (3 marks)
   b) Describe the function of a switch within a network. (3 marks)
   c) Define Network Automation and explain the benefits of using Network Automation within a Network. (4 marks)
   d) Provide TWO potential effects of IoT devices on home networks. (2 marks)

B12. 
   a) Describe with an example, THREE cloud service delivery models. (6 marks)
   b) Consider the impact of migration to a cloud service. Suggest THREE effects it might have on the employees of a company. (6 marks)

END OF EXAMINATION
Section B
Answer five questions (out of eight). Each question carries 12 marks.

B5.

a) Describe the function of STP within a network. (3 marks)
b) Describe the function of NTP. (3 marks)
c) Describe the components of an 802.3 Ethernet Frame. (6 marks)

B6.

a) Provide THREE examples of peripherals that can be connected to a modern PC. (3 marks)
b) Discuss THREE LED/LCD Panel Display Technologies and list at least ONE advantage and ONE disadvantage for each technology. (9 marks)

B7.

a) Represent the following and show working:
   i. The binary 01100001 as a Decimal value. (6 marks)
   ii. Decimal 62 as a Binary value.
   iii. Decimal 17 as a Hexadecimal value.

b) Represent the following and show working:
   i. Decimal 52 in base 8.
   ii. Hexadecimal 1A in base 4.
   iii. Binary 1011 in base 8. (6 marks)

B8.

a) Describe what is meant by Peripheral Polling. (3 marks)

b) Describe why Seek/Read performance of flash based solid storage is greatly improved over spinning platter drives. (3 marks)

c) Explain with the help of a diagram the fetch/execute cycle. (6 marks)

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 what is meant by the following network specific attacks, giving examples and detail the likely impact of each attack:
   i. Scanning
   ii. Sniffing
   iii. Denial of Service
   iv. MITM
   v. Social Engineering. (30 marks)

A2.
Base and limit register MMUs can support swapping.

a) Explain what is meant by swapping. (2 marks)

b) Discuss if swapping will permit an application requiring 32MB memory to run on a virtual machine with 16MB of RAM. (4 marks)

c) Describe what is meant by “page-based” virtual memory. In your answer include terminology such as pages, frames, page tables and MMU. (10 marks)

d) Describe what is meant by “segmentation-based” virtual memory. In your answer include terminology such as memory address, the segment table and its contents, and how the final physical address is formed. (10 marks)

e) What are the advantages of a system with page-based virtual memory compared to a system with base-limit registers implementing “swapping”? (4 marks)
A3.
Logic gates are the basic building blocks of computer systems.

a) What is the logical function of the following logic gates? Produce a truth table for each logic gate identified.

i.

ii.

iii.

iv.

v.

vi.

b) For the following logic circuit, complete the truth table for A, B, C, D, E, F & X. What is the logic function represented by this logic circuit?

A4.
Multi-tasking enables more than a single process to apparently execute simultaneously.

a) Explain how this is achieved on a uniprocessor. (7 marks)

b) Describe what is meant by a process and explain its various attributes. (7 marks)

c) Discuss the relationship between threads and processes. (5 marks)

d) With the aim of supporting diagrams, detail how a multi-threaded application can be supported by the use of user-level threads. (11 marks)