

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.

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- 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.
 - ii. Decimal 62 as a Binary value.
 - iii. Decimal 17 as a Hexadecimal value.**(6 marks)**
- 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.

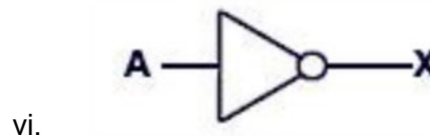
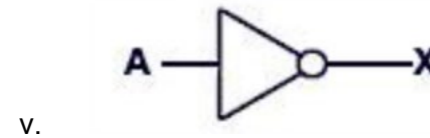
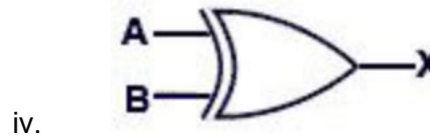
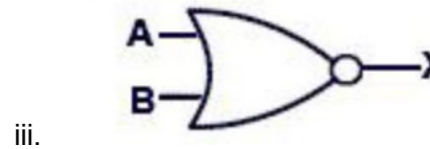
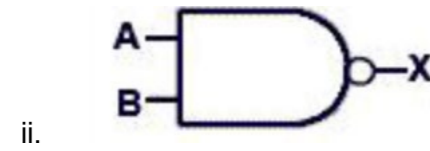
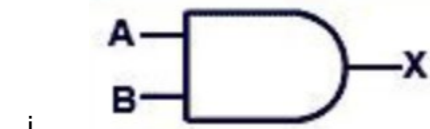
Base and limit register MMUs can support swapping.

- 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)**

[Turn Over]

A3. Logic gates are the basic building blocks of computer systems.

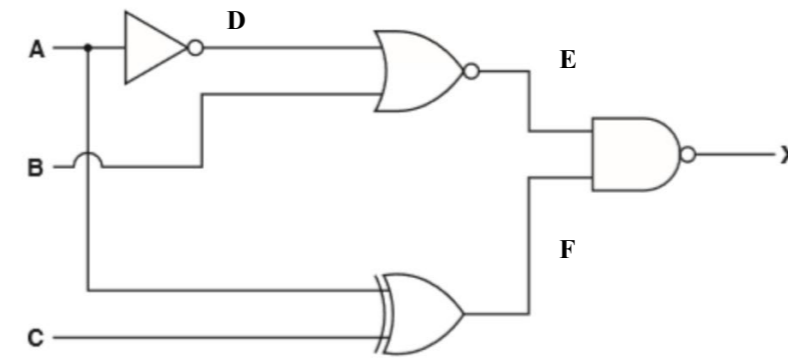
a) What is the logical function of the following logic gates? Produce a truth table for **each** logic gate identified.



(18 marks)

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?



(12 marks)

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)

[Turn Over]