



National Open University of Nigeria
Faculty of Sciences
Department of Computer Science
2024 1 EXAMINATION

CIT711 - Computer Fundamentals Examination

Instruction: Answer Question 1 and any other three questions

Time Allowed: 2 ¾ hours

Question 1:

- a. (i) Explain the concept of virtual memory and its benefits **5 marks**
(ii) Name the four categories of computer programming languages **2 marks**
- b. (i) Explain the star topology for LAN networks and discuss its advantages and disadvantages. **5 marks**
(ii) Briefly describe the purpose of Electronic Data Interchange (EDI). **2 marks**
- c. Describe the functions performed by anti-virus programs **5 marks**
- d. Discuss the role of an Arithmetic Logic Unit (ALU) in a computer system. **6 marks**

Question 2:

- a. Explain the difference between random access memory (RAM) and sequential access memory. **3 marks**
- b. Compare and contrast DDR3 and DDR4 memory technologies using the following yardsticks:
 - Cost
 - Compatibility
 - Maturity
 - Access speed/ bandwidth
 - Power consumption**10 marks**
- c. What are the characteristics of a magnetic disk? **2 marks**

Question 3:

- a. What protocol is commonly used to connect computers to the Internet? **1 mark**
- b. Analyze the advantages and disadvantages of using a wireless LAN (WLAN) compared to a wired LAN **8 marks**
- c. Design a WAN connectivity solution for a company with multiple branches located in different cities. **6 marks**

Question 4:

- a. Why are magnetic tapes more suitable for archival storage or backup purposes? **2 marks**
- b. Propose a novel approach to improve data compression techniques for storage systems. **6 marks**
- c. Design a storage solution for a large-scale data center that maximizes both performance and fault tolerance. **8 marks**

Question 5:

- a. (i) What is computer security? **2 marks**
(ii) Explain the concept of privacy in the context of computer security **2 marks**
- b. Describe **four** ways in which data loss or manipulation can occur in a computer system. **8 marks**

- c. Suggest ways to mitigate the risks associated with the scenarios described in *question 5b* above. **3 marks**

Question 6:

- a. (i) Define cryptology and state the purpose of cryptography **2 marks**
(ii) Encrypt the plain text "HELLO" using a Caesar Cipher with a key shift of 5 **3 marks**
- b. Describe a transposition cipher and provide an example. **5 marks**
- c. Explain the concept of a code system in cryptography. Use a clear example to illustrate your points. **5 marks**

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