



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI-ABUJA
FACULTY OF COMPUTING
DEPARTMENT OF COMPUTER SCIENCE
2025_2 EXAMINATIONS

COURSE CODE: CIT314

COURSE TITLE: Computer Architecture and Organization

CREDIT: 3 Units

TIME: 3 Hours

INSTRUCTION: Answer Question ONE (1) and any other THREE (3) Questions

Question 1

1a. Distinguish between Computer Organization and Computer Architecture. **(5 Marks)**

1b. List three (3) advantages of Hardwired Control Units. **(3 Marks)**

1c. List five (5) characteristics of Magnetic Storage Tapes. **(5 Marks)**

1d. In computer architecture, data needs to be accessed from the memory for various purposes. Identify and explain four (4) methods used to access memory. **(12 Marks)**

Question 2

2a. List four (4) primary types of Auxiliary Storage Devices. **(2 Marks)**

2b. Highlight four (4) Advantages of Micro-programmed Control Unit. **(4 Marks)**

2c. Identify and describe four (4) access rights of interest that are used for protecting the programs residing in memory. **(9 Marks)**

Question 3

3a. Multiprogramming operating system allows executing multiple processes by monitoring their process states and switching in between processes. Outline three (3) Advantages and three (3) Disadvantages of Multiprogramming. **(6 Marks)**

3b. Identify and describe two (2) main types of perimeter-based technologies. **(3 Marks)**

3c. Compare Synchronous versus Asynchronous Data Transmission in four (4) sentences. **(6 Marks)**

Question 4

4a. Discuss the following two (2) basic characteristics of Fault Tolerant Systems. **(4 Marks)**

- i. No Single Point of Failure
- ii. Fault isolation or identification

4bi. The concepts of faults, errors, and failures can be best presented by the use of a Three-Universe Model that is an adaptation of Four-Universe Models; Briefly describe the First Universe. **(2 Mark)**

4bii. Fault Tolerance methods can be applied to cloud computing in three (3) levels. Identify and explain these levels. **(4 $\frac{1}{2}$ Marks)**

4c. Discuss three (3) Fault tolerance design goals. **(4 $\frac{1}{2}$ Marks)**

Question 5

5a. Strobe control method of data transfer uses a single control signal for each transfer. Using a timing diagram, describe a Source Initiated Strobe. **(3 Marks)**

5b. Several types of faults may occur in the cloud environment leading to failures and performance degradation. Identify and describe four (4) main types of faults in cloud computing environments. **(6 Marks)**

5c. Identify and explain four (4) fault tolerance techniques or methods often used by programmers. **(6 Marks)**

Question 6

6a. Highlight three (3) drawbacks that occur in virtual memories. **(3 Marks)**

6b. In the context of memory organization, discuss the concept of Access time (latency). **(2 Marks)**

6c. Discuss the key differences between Hardwired Control Unit and Microprogrammed Control Unit by filling in the blank spaces in the table below. **(10 Marks)**

ATTRIBUTES	HARDWIRED CONTROL UNIT	MICROPROGRAMMED CONTROL UNIT
1. Speed		
2. Cost of Implementation		
3. Flexibility		
4. Ability to Handle Complex Instructions		
5. Decoding		
6. Applications		
7. Instruction set of Size		
8. Control Memory		
9. Chip Area Required		
10. Occurrence		