

PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

END OF TERM EXAMINATION

DEPARTMENT: COMPUTING & INFORMATION TECHNOLOGY

COURSE CODE: BSIT 206

CAMPUS: ROYSAMBU

COURSE TITLE: COMPUTER ORGANIZATION AND ARCHITECTURE

EXAM DATE: MONDAY, DATE (APRIL 2025)

TIME: START HOUR – END 8:00-10:00 HRS

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other THREE questions in Section **B**.
- Write only your **student number** on the answer booklet provided.

SECTION A

(Answer ALL questions in this section)

QUESTION 1

a) Tom has been tasked with assembling a computer system for a small business.

Describe **FOUR** essential components he would include and justify your choices

**[4
Marks]**

b) Convert the following number systems to its equivalent

i. Convert 1001_2 to decimal

[2

Marks]

ii. Convert 345_{10} to hexadecimal

[2

Marks]

iii. Convert 34_{10} to binary

[2

Marks]

SECTION B

(Answer any THREE (3) questions in this section)

QUESTION 2

a) Victoria, a new IT support trainee, is tasked with optimizing computer systems for a company. To improve her understanding, she needs to differentiate between computer organization and computer architecture. Explain **FOUR** key differences between these two concepts

[4 Marks]

b) Tiffany is responsible for managing a company's computer systems. Recently, employees have reported slow system performance, frequent application crashes, and unresponsive programs. After investigating, she suspects that the issue is related to memory management. Explore **THREE** memory management techniques Tiffany can use to optimize system performance.

[6Marks]

QUESTION 3

- a) Consider the diverse applications of Reduced Instruction Set Computers (RISC) architectures such as ARM, MIPS, and PowerPC. Using MIPS architecture discuss **THREE** its real-world applications across different domains **[6Marks]**
- b) Describe the term pipelining in CPU architecture, and explain ways it improve performance **[4Marks]**

QUESTION 4

- a) Imagine you are tasked with optimizing the performance of a company's computer systems. One of the main challenges is slow execution times for software applications that are frequently used by employees. After analyzing the system architecture, you notice that the CPU has a high number of cache misses and the memory access time seems to be affecting overall performance.
 - i. Using your knowledge of computer architecture, explain ways the CPU cache hierarchy works **[4Marks]**
 - ii. Explore ways you would optimize CPU cache hierarchy to reduce cache misses. **[2Marks]**
 - iii. Describe ways you would assess the impact of these optimizations on the system's overall performance. **[4Marks]**

QUESTION 5

- a) Explain the working of a full adder and provide the truth table **[4Marks]**
- b) Explain **SIX** types of Boolean Laws that James can use to simplify and optimize his digital circuit logic **[6Marks]**

QUESTION 6

- a) Explore **TWO** Applications of XOR gates in logic circuits **[4Marks]**
- b) Explain **THREE** types of special-purpose registers and their functions in data processing. **[6Marks]**

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