

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: BIT/BSIT 103

CAMPUS: ROYSAMBU

COURSE TITLE: OPERATING SYSTEMS

EXAM DATE: MONDAY, DATE (APRIL 2025)

TIME: START HOUR – END 11:00-1:00 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) Kelvin is working as an IT administrator in a company that handles large-scale data processing tasks. He is considering implementing a simple batch system to streamline job execution. Discuss **TWO** advantages James would gain. **[4Marks]**
- b) James is testing two scheduling algorithms: First-Come, First-Served (FCFS) and Shortest Job Next (SJN). He notices that SJN improves turnaround time but leads to starvation for longer jobs. Discuss **TWO** ways he can modify the scheduling strategy to prevent starvation **[2Marks]**
- c) Ritah is tasked with upgrading her company's server infrastructure to improve performance and reliability. She is considering using multiprocessor systems. Explore **FOUR** benefits she can expect from adopting a multiprocessor system in this upgrade. **[4Marks]**

SECTION B

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

QUESTION 2

- a) Gladys is managing a university's computing lab and needs to ensure efficient processing of multiple student jobs submitted to the system. Discuss **THREE** job scheduling functions she should consider implementing to optimize system performance. **[6Marks]**
- b) While troubleshooting a client's computer, James notices frequent system slowdowns and unresponsiveness. Discuss **TWO** possible causes of interrupts that might be affecting system performance.

[4Marks]

QUESTION 3

- a) A software development company is working on optimizing the performance of its real-time and batch processing systems. What are the **TWO** general categories of scheduling they should focus on providing relevant example of each **[6 Marks]**
- b) Jane is developing a high-performance banking application that requires handling multiple user transactions simultaneously. Should she use threads or processes to achieve efficiency, Provide reasons to support your answer. **[4Marks]**

QUESTION 4

- a) A logistics company uses an automated inventory management system that occasionally experiences system freezes. Explain **THREE** conditions must be present for a deadlock to occur in this system
[6Marks]
- b) Racheal is designing a file management system for a research organization where different teams require various ways to retrieve stored information. Discuss **TWO** ways to access a file.
[4Marks]

QUESTION 5

- a) Janet is managing a virtualized server environment where memory management plays a critical role. Explain how swapping occurs in this system with the help of a diagram.
[4Marks]
- b) A small business is using an older operating system that relies on variable partitioning for memory allocation. Discuss **THREE** challenges they might face with this approach.
[6Marks]

QUESTION 6

- a) James is designing a hospital management system that processes multiple requests from different departments. Explore **THREE** ways James can prevent deadlocks
[6Marks]
- b) David is analyzing CPU scheduling performance using turnaround time, waiting time, and response time as metrics. Which scheduling algorithm generally provides the lowest average waiting time and provide reasons
[4Marks]

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