

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,XXXX,AUGUST ,2025

TIME: 2:00PM -5:00PM

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)

QUESTION 1

- a) SmartAgro is a smart farming solution in the Mt. Kenya region that uses embedded sensors, drones, and centralized servers to monitor soil conditions, detect plant diseases, and automate irrigation. It requires real-time responsiveness, efficient resource use, and reliable data handling.
- i. Describe **TWO** main functions of an Operating System as applied in SmartAgro's central server. **[2 Marks]**
- ii. Explain **TWO** methods of communication between embedded sensors and the central server in the SmartAgro system. **[2 Marks]**
- iii. Explain **THREE** strategies SmartAgro can use to prevent or manage deadlocks when multiple devices compete for limited resources. **[3 Marks]**
- b) Operating systems have evolved significantly over time. Explain **THREE** key milestones in the historical development of operating systems and their impact on modern computing systems. **[3 Marks]**

SECTION B (Answer ANY THREE questions)

QUESTION 2

- a) John is developing software for machines used in a factory. Describe **THREE** common challenges he might face when creating embedded systems for industrial automation **[6 Marks]**

- a) In a multi-user system, tasks can be scheduled in different ways. Give **TWO** situations where using non-preemptive scheduling is better than preemptive scheduling, and explain why it's more suitable in those cases. **[4 Marks]**

QUESTION 3

John, a senior designer at CreativeEdge, often experiences system slowdowns when working on large design projects using software like Photoshop and 3D modeling tools. This happens even though the studio uses high-end computers.

- a) Explain how paging is used in memory management and describe the role of a page table in this process. **[4 Marks]**

b)

- i. Based on John's experience, explain how virtual memory helps alleviate memory shortages in his workstation. **[2 Marks]**

ii. Identify **TWO** other possible causes of system slowdowns at CreativeEdge (excluding insufficient memory), and propose appropriate solutions for each.

[4 Marks]

QUESTION 4

- a) James is studying how computers store files on a hard drive. Describe **THREE** different file allocation methods used in modern file systems. **[6 Marks]**

- b) A company is trying to keep its server running fast and smoothly. Describe **TWO** disk management techniques they can use to improve disk performance and make better use of storage space. **[4 Marks]**

QUESTION 5

a) A new employee is learning to use the Windows Command Prompt. Explain the purpose of the following commands: **[4 Marks]**

- i. cd
- ii. del
- iii. dir
- iv. copy

b) Discuss **THREE** considerations an organization should make when selecting an operating system for office workstations **[6 Marks]**

QUESTION 6

TechNova Ltd. is a software company that recently faced a cyberattack targeting its operating systems and data. To improve system protection and prevent future data loss, the company decided to implement stronger OS security techniques and reliable backup strategies.

a) Explain **THREE** techniques used to enhance security and protection in operating systems. **[6 Marks]**

b) TechNova Ltd. wants to minimize data loss risks. Describe **TWO** backup strategies they can implement. **[4 Marks]**

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