PAN AFRICA CHRISTIAN UNIVERSITY
Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BIT /BSIT 405/207

E-COMMERCE AND CLOUD COMPUTING

END TERM EXAMINATION

DATE: AUGUST, 2026 **TIME: 3 HOURS**

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

SECTION A (COMPULSORY)

QUESTION ONE (15 Marks) Compulsory

"SokoCloud" is a rapidly expanding Kenyan startup operating a hybrid business model that connects manufacturers directly to consumers (D2C) and facilitates wholesale transactions between businesses (B2B). The company is migrating its entire legacy web infrastructure to the cloud to manage a growing user base, complex customer data, and high transaction volumes.

a) Design a scalable, cloud-integrated architecture for SokoCloud. In your design, evaluate and justify the selection of appropriate cloud service models (IaaS, PaaS, or SaaS) and a specific cloud deployment model (e.g., Public, Private, Hybrid) to support their scaling needs. **(5 Marks).**

b) Formulate a secure online payment workflow integrating M-PESA. As part of your workflow, critically assess the necessary compliance measures SokoCloud must implement to adhere to the Kenya Data Protection Act 2019 **(5 Marks).**

c) To ensure customer retention and acquisition in a highly competitive market, develop a targeted digital marketing strategy that utilizes Search Engine Optimization (SEO) and Customer Relationship Management (CRM) analytics **(5 Marks).**

SECTION B

(ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (15 marks)

A traditional brick-and-mortar fashion retailer in Nairobi is shifting entirely to a Direct-to-Consumer (D2C) e-commerce business model.

a) Analyze how the required e-commerce infrastructure and web technologies for a purely D2C model differ from their previous traditional retail setup **(7 Marks).**

b) Propose a comprehensive social commerce and mobile commerce strategy that capitalizes on the ubiquitous use of smartphones in Kenya to maximize their initial market penetration **(8 Marks).**

QUESTION THREE (15 marks)

A county government intends to launch a Business-to-Government (B2G) e-procurement portal to streamline tender applications. However, there are significant concerns regarding data sovereignty, operational costs, and variable workload spikes during peak procurement cycles.

a) Recommend and justify a specific cloud deployment model (Public, Private, Hybrid, or Community) that optimally balances the government's need for strict security with accessibility **(7 Marks).**

b) Outline a cost optimization and performance management strategy within the cloud environment to handle the unpredictable traffic spikes typical of government procurement cycles **(8 Marks).**

QUESTION FOUR (15 marks)

A major regional e-commerce platform utilizes AWS S3 for storing millions of product images and relies heavily on Docker basics for containerizing their shopping cart microservices.

a) Examine the role of containerization in maintaining high availability and rapid scaling for the e-commerce platform during flash sales **(7 Marks).**

b) Apply the Cloud Shared Responsibility Model to articulate clearly which security, compliance, and governance aspects fall to the cloud provider (AWS) and which remain the responsibility of the e-commerce platform's IT team **(8 Marks).**

QUESTION FIVE (15 marks)

To maintain a competitive edge, a mature online marketplace is exploring the integration of emerging trends and modern cloud architectures.

a) Formulate an operational plan for integrating serverless computing (such as AWS Lambda) to handle the platform's asynchronous tasks, like automated order confirmations and inventory updates **(7 Marks).**

b) Evaluate how Artificial Intelligence (AI) can be leveraged alongside Internet of Things (IoT) data to provide hyper-personalized shopping experiences and forecast the future of this digital commerce strategy **(8 Marks).**

QUESTION SIX (15 marks)

A new Consumer-to-Consumer (C2C) platform allows independent digital artists to upload, sell, and stream high-resolution video content and digital art directly to buyers.

a) Compare the technical suitability and cost implications of using Google Firebase versus Azure Blob storage to host and deliver the platform's massive volumes of unstructured media data **(8 Marks).**

b) Design a robust security framework for the platform that protects intellectual property and user transaction data against emerging cyber threats **(7 Marks).**