PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

END-OF-TERM EXAMINATION

DEPARTMENT:	**COMPUTING & INFORMATION TECHNOLOGY**
COURSE CODE:	**BSIT410**
CAMPUS:	**ROYSAMBU**
COURSE TITLE:	**BLOCKCHAIN TECHNOLOGY**
EXAM DATE:	**DAY OF WEEK, DATE (DDTH MONTH YEAR)**
TIME:	**START HOUR – END 13:00-17:00 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.
- None programmable calculators permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

© Copyright 2026 All Rights Reserved PAC University

SECTION A
(Answer ALL questions in this section)

Question 1

A government is implementing a Blockchain-Based Land Registry System (BLRS) to improve transparency, security, and efficiency in land ownership transactions. The system ensures that all land records are stored in an immutable blockchain ledger, preventing fraud and unauthorized alterations. The system also enables smart contract-based property transactions using Ethereum and Solidity.

a) Justify the suitability of blockchain technology for a land registry system **(1 Mark)**

b) Explain how the consensus mechanism ensures that only valid land transactions are recorded on the blockchain **(2 Marks)**

c) State three roles of cryptographic hashing in ensuring data security in a blockchain-based land registry **(3 Mark)**

d) Identify two **challenges** of using blockchain for land registry systems **(2 Marks)**

e) Describe two features of Ethereum that enhance **transparency and security** in land transactions. **(4 Marks)**

f) Discuss three functions a Solidity smart contract for land ownership transfer should include. **(3 Marks)**

QUESTION 2

a) Discuss FIVE application areas in which PAC University can leverage blockchain for competitive advantage **(10 Marks)**

b) Describe the concept of P2P networking about blockchain Technology **(5 Marks)**

© PAC UNIVERSITY 2026

QUESTION 3

A multinational company has implemented a Blockchain-Based Supply Chain Management System to enhance transparency, traceability, and security in the movement of goods from manufacturers to retailers. The system ensures that all transactions, including product manufacturing, shipping, and delivery, are recorded on a blockchain. To maintain data integrity and prevent fraud, the system uses a consensus protocol to validate transactions before they are added to the blockchain. The company is evaluating different consensus mechanisms, including Proof of Work (PoW), Proof of Stake (PoS), and Practical Byzantine Fault Tolerance (PBFT), to determine the most efficient approach.

a) Explain the importance of a consensus protocol in a blockchain-based supply chain system **(4 Marks)**

b) Justify a suitable consensus mechanism for a supply chain blockchain in the above case study **(3 Marks)**

c) Explain two challenges of using Proof of Work (PoW) in a supply chain management system. **(2 Marks)**

d) The company is exploring Practical Byzantine Fault Tolerance (PBFT) for validating supply chain transactions. Explain three advantages of using PBFT over PoW **(6 Marks)**

QUESTION 4

a) Explain FOUR ways a smart contract can influence the healthcare sector **(8 Marks)**

b) Identify SEVEN components of a smart contract in the following code snippet **(7 Marks)**

1. pragma solidity ^0.4.24;

© PAC UNIVERSITY2026

```
2. contract ColorEnum {
3. enum Color {RED,ORANGE,YELLOW, GREEN}
4. Color color;
5. function construct() public {
6. color = Color.RED;
7. }
8. function setColor(uint _value) public {
9. color = Color(_value);
10.}
11.function getColor() public view returns (uint){
12.return uint(color);
13.}
14.}
```

QUESTION 5

A government agency is implementing an Ethereum-based Digital Identity Management System to provide citizens with secure, verifiable, and decentralized identity records. The system uses Ethereum smart contracts to store identity details, allowing individuals to control their personal data while enabling authorized institutions (e.g., banks, healthcare providers) to verify identities securely. To ensure efficiency and transparency, the system utilizes Ethereum's blockchain, smart contracts, and token standards to facilitate secure identity verification and authentication without relying on a central authority.

a) Justify the suitability of Ethereum as blockchain for implementing a digital identity management system **(4 Marks)**

b) Explain how Ethereum ensures the security and immutability of stored identity records **(3 Marks)**

c) Describe how Ethereum smart contracts enhance trust in digital identity verification **(6 Marks)**

d) Explain why an Ethereum-based identity system might use ERC-721 tokens instead of ERC-20 tokens **(2 Marks)**

QUESTION 6

© PAC UNIVERSITY2026

a) Describe the role of EVM in distributed application development **(8 Marks)**

b) Highlight methods required in ERC-20 specifications **(7 Marks)**

EOF

© PAC UNIVERSITY2026