SAMPLE PAPERS

DIPLOMA FIFTH SEMESTER EXAMINATION 2025 (JUT)

BLOCK CHAIN TECHNOLOGY

DIPLOMA WALLAH

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Full Marks: 70 marks | Time: 3 Hours

Instructions:

- Question No. 1 is compulsory.

- Answer any **FOUR** questions from the remaining (Q.2 to Q. 7 marks).

Q.1 (Compulsory) — Multiple Choice Questions

(2 Marks each × 7 = 14 Marks)

(i) Which tool is used for the "Front End" development in the context of Hyperledger Fabric syllabus?

(A) WordPress

(B) Fabric SDK

(C) Photoshop

(D) MS Excel

(ii) "Provenance of goods" is a key application in which sector?

(A) Capital Markets

(B) Trade/Supply Chain

(C) Digital Identity

(D) Social Welfare

(iii) The concept of "Digital Money to Distributed Ledgers" is found in:

(A) Unit I - History

(B) Unit V - Cryptography

(C) Unit III - Fabric

(D) Unit II - PoW

(iv) Which of the following is a "Design Goal" for Permissioned Blockchains?

(A) Anonymity for illegal activities

(B) High Energy Consumption

(C) Identity Management

(D) Public Access for everyone

(v) "Hash chain to Block chain" describes the transition from:

(A) A simple linked list of hashes to a block-based ledger

(B) A centralized database to cloud storage

(C) Physical money to credit cards

(D) 2G to 5G networks

(vi) In Hyperledger Fabric, the "Chain code" is synonymous with:

(A) Cryptocurrency

(B) Smart Contract

(C) User Password

(D) Mining Rig

(vii) "Social welfare systems" are discussed under Blockchain for:

(A) Government

(B) Private Equity

(C) Stock Exchange

(D) Gaming

Q.2

(A) Explain the evolution of digital money to distributed ledgers. [7M]

(B) Explain the complete process of Decomposing the Consensus Process. [7M]

Q.3

(A) Describe the Blockchain Architecture and Design in detail. [7M]

(B) Explain the Design Goals and the specific Consensus Protocols used for Permissioned Block Chains. [7M]

Q.4

(A) What is a Hash Chain? Explain the function of Basic crypto primitives in Blockchain. [7M]

(B) Discuss the critical role of Block Chain for Government, detailing its application in Record Keeping and Land Records. [7M]

Q.5

(A) Explain the process of Chain Code Design and Implementation. [7M]

(B) Describe the application of Block Chain in Trade/Supply Chain: Visibility and Invoice Management. [7M]

Q.6

(A) Elaborate on the various applications of Block Chain in Financial Software and Systems (FSS), focusing on Capital Markets and Insurance. [7M]

(B) Discuss the concepts of Privacy and Security on Block Chain. [7M]

Q.7 Write Short Notes on (Any FOUR): [3.5 × 4 = 14M]

(A) Requirements for a good consensus protocol

(B) Digital Money concept

(C) Government Record Keeping challenges

(D) Invoice Management/Discounting

(E) Permissions in Block Chain

SOLUTIONS & ANSWER KEY (PAPER 3)

MCQ Answer Key:

(i) B (Fabric SDK)

(ii) B (Trade/Supply Chain)

(iii) A (Unit I - History)

(iv) C (Identity Management)

(v) A (Simple linked list... to block-based ledger)

(vi) B (Smart Contract)

(vii) A (Government)

Theory Hints (Model Answers based on IQs):

- **Q2(A):** Progression from digital cash (Chaumian e-cash) to solving double spending via DLT (Bitcoin).

- **Q2(B):** Breaking down consensus into: Proposal, Validation, Ordering, Committing.

- **Q3(A):** Block Header, Merkle Tree, Timestamp, Previous Hash, Nonce.

- **Q3(B):** Goals: Finality, Performance. Protocols: RAFT, Paxos, PBFT.

- **Q4(A):** Hash Chain = Sequence of hashes. Primitives = Hash (SHA-256) & Signatures (ECDSA).

- **Q4(B):** Government: Secure storage, Inter-departmental sharing, Tamper-proof land titles.

- **Q5(A):** Designing functions (Init, Invoke), State database interaction, Endorsement policies.

- **Q5(B):** Visibility: Track and Trace. Invoice: Factoring, discounting based on verified blockchain data.

- **Q6(A):** Capital Markets: Faster settlement (T+0). Insurance: Parametric insurance via smart contracts.

- **Q6(B):** Security = Immutable ledger. Privacy = Controlling who sees what (Channels in Fabric).

- **Q7:** Refer to Short Questions section of IQ file.