

SAMPLE PAPERS**DIPLOMA FIFTH SEMESTER EXAMINATION 2025 (JUT)****BLOCK CHAIN TECHNOLOGY****DIPLOMA WALLAH**[CLICK HERE TO VISIT DIPLOMA WALLAH WEBSITE](#) (MADE WITH ❤ BY SANGAM)

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 consensus protocol is primarily associated with Permissioned Blockchains in the syllabus context?

(A) Proof of Work (PoW)
 (B) PBFT (Practical Byzantine Fault Tolerance)
 (C) Proof of Burn
 (D) Dogecoin Protocol

(ii) The "Fabric SDK" allows interaction between the client application and which component?

(A) The Mining Rig
 (B) The Hyperledger Fabric Network
 (C) The Bitcoin Exchange
 (D) The Central Bank

(iii) In the syllabus, "Settlements" and "KYC" are sub-topics of which unit?

(A) Unit I
 (B) Unit II
 (C) Unit IV
 (D) Unit V

(iv) Which of the following is NOT a layer in the Design Primitives of Blockchain?

(A) Protocols
 (B) Consensus

(C) Social Media Integration

(D) Permissions

(v) Digital Identity and Land Records are applications of Blockchain for:

(A) Financial Software Systems

(B) Government

(C) Supply Chain Finance

(D) Insurance

(vi) The "Double Spending Problem" was a key motivation for the history of:

(A) Relational Databases

(B) Digital Money

(C) Cloud Computing

(D) Artificial Intelligence

(vii) A "Hash" function transforms arbitrary data into a:

(A) Variable length string

(B) Fixed-size string (digest)

(C) Picture

(D) Private Key

SECTION B (Theory Questions)

(Answer any FOUR. Each question carries 14 Marks)

Q.2

(A) Describe the function of the basic crypto primitives: Hash and Digital Signature in securing the Block Chain. [7M]

(B) Elaborate on the working principle of Proof of Work (PoW) and discuss Scalability aspects in Block Chain consensus protocols. [7M]

Q.3

(A) Describe the key components of Hyperledger Fabric and their roles in achieving consensus. [7M]

(B) Discuss the concept of Hyperledger Fabric II and its advancements beyond basic Chain Code. [7M]

Q.4

(A) Discuss the specific roles of Blockchain in Settlements and KYC (Know Your Customer). [7M]

(B) Explain how Block Chain technology is transforming Trade/Supply Chain Finance and Invoice Management. [7M]

Q.5

(A) Discuss the critical role of Block Chain for Government, specifically in managing Public Distribution System / Social Welfare Systems. [7M]

(B) Elaborate on the various applications of Block Chain in Insurance. [7M]

Q.6

(A) Explain the Design Primitives of Blockchain: Protocols, Security, Consensus, and Permissions. [7M]

(B) Differentiate between Permissioned and Permissionless Block Chains with examples. [7M]

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

(A) Chain Code (Smart Contracts)

(B) Basic Consensus Mechanisms (other than PoW)

(C) Provenance of Goods

(D) Privacy design primitive

(E) Digital Signature ensuring non-repudiation



SOLUTIONS & ANSWER KEY (PAPER 2)

MCQ Answer Key:

- (i) B (PBFT - implied by syllabus context of Permissioned chains)
- (ii) B (The Hyperledger Fabric Network)
- (iii) C (Unit IV)
- (iv) C (Social Media Integration)
- (v) B (Government)
- (vi) B (Digital Money)
- (vii) B (Fixed-size string)

Theory Hints (Model Answers based on IQs):

- **Q2(A):** Hash = Integrity (One way function). Signature = Authenticity + Non-repudiation.
- **Q2(B):** PoW = Computational effort. Scalability issue = Low throughput, high latency.
- **Q3(A):** Components: Peers (Endorsing/Committing), Orderers, CA, Clients.
- **Q3(B):** Fabric II enhancements: Fabric Private Chaincode (FPC), improved lifecycle management.
- **Q4(A):** Settlements: Removing intermediaries. KYC: Shared digital identity to reduce cost.
- **Q4(B):** Finance: Automating letters of credit. Invoice: Preventing duplicate financing (double spending).
- **Q5(A):** PDS: Tracking subsidies, reducing leakage, ensuring goods reach beneficiaries.
- **Q5(B):** Automating claims, fraud detection via smart contracts.
- **Q6(A):** Protocol (Rules), Security (Crypto), Consensus (Agreement), Permissions (Access).
- **Q6(B):** Permissionless (Bitcoin, slow, public) vs Permissioned (Fabric, fast, private).
- **Q7:** Refer to "Quick Revise" and Short Questions section of IQ file.