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MCA
(SEM IV) THEORY EXAMINATION 2024-25
BLOCKCHAIN ARCHITECTURE

TIME: 3 HRS**M.MARKS: 100****Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

| Q No. | Question | CO | Level |
|-------|---|----|-------|
| a. | Define blockchain. | 1 | K1 |
| b. | What is a digital signature? | 1 | K1 |
| c. | List any two design primitives in blockchain. | 1 | K2 |
| d. | Define consensus in the context of blockchain. | 2 | K1 |
| e. | Mention any two consensus mechanisms. | 2 | K2 |
| f. | What is PoW in blockchain? | 2 | K2 |
| g. | What is chaincode in Hyperledger Fabric? | 4 | K1 |
| h. | List two applications of blockchain in supply chain. | 5 | K4 |
| i. | What is Hyperledger Composer? | 4 | K2 |
| j. | Mention two features of blockchain for public governance. | 5 | K4 |

SECTION B**2. Attempt any three of the following:****10 x 3 = 30**

| Q No. | Question | CO | Level |
|-------|---|----|-------|
| a. | Explain the design primitives of blockchain architecture with relevant examples. | 1 | K2 |
| b. | Compare permissioned and permissionless blockchains with use cases. | 2 | K4 |
| c. | Describe the scalability issues in blockchain consensus protocols. | 2 | K4 |
| d. | Describe the architecture and components of Hyperledger Fabric. | 4 | K1 |
| e. | Explain the role of blockchain in financial software systems such as insurance and KYC. | 5 | K4 |

SECTION C**3. Attempt any one part of the following:****10 x 1 = 10**

| Q No. | Question | CO | Level |
|-------|--|----|-------|
| a. | Describe the evolution from digital money to distributed ledgers | 1 | K1 |
| b. | Explain Bitcoin basics and the use of hashchains in blockchain. | 1 | K2 |

4. Attempt any one part of the following:**10 x 1 = 10**

| Q No. | Question | CO | Level |
|-------|---|----|-------|
| a. | What are the key requirements for consensus protocols? Explain with examples. | 2 | K4 |
| b. | Describe the Proof of Work mechanism with an example from Bitcoin. | 2 | K4 |



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5. Attempt any one part of the following: 10 x 1 = 10

| Q No. | Question | CO | Level |
|-------|---|----|-------|
| a. | Illustrate the process of chaincode implementation in Hyperledger Fabric. | 4 | K1 |
| b. | Discuss the role and structure of the Hyperledger Fabric SDK and Composer tool. | 4 | K2 |

6. Attempt any one part of the following: 10 x 1 = 10

| Q No. | Question | CO | Level |
|-------|---|----|-------|
| a. | Explain the use of blockchain in capital markets and insurance with real-world scenarios. | 5 | K5 |
| b. | How can blockchain improve provenance tracking in supply chains? | 5 | K5 |

7. Attempt any one part of the following: 10 x 1 = 10

| Q No. | Question | CO | Level |
|-------|--|----|-------|
| a. | Discuss how blockchain can be utilized for land record management by the government. | 5 | K5 |
| b. | Explain privacy and cryptographic concerns in blockchain-based government systems. | 5 | K5 |

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