Total number of printed pages: **UG/08/UCSE812**

2023

BLOCKCHAIN TECHNOLOGY

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) Discuss the role of cryptographic hash functions in data integrity verification. Explain how a hash function can be used to verify the integrity of a file or message. 5+5=10

   b) Explain the concept of public key cryptography. How are encryption and decryption performed using public key cryptography? 5+5=10

2. a) Explain the concept of a blockchain network and its key components. Discuss the role of nodes, miners, and consensus algorithms in maintaining the integrity and security of the blockchain network. 4+6=10

   b) Explain how consensus algorithms Proof of Work (PoW) and Proof of Stake (PoS), ensure agreement among network participants. 5+5=10

3. a) Explain the concept of a distributed ledger in the context of blockchain technology. Discuss the key characteristics and advantages of using a distributed ledger system over a centralized database. 5+5=10

   b) Discuss the concept of a Decentralized Autonomous Organization (DAO). Explain how a DAO operates, including its decision-making processes and governance structures. Provide examples of notable DAOs. 3+3+4=10

4. a) Explain the features and capabilities of Ethereum as a blockchain platform. Discuss its role in enabling smart contracts, decentralized applications (DApps), and the Ethereum Virtual Machine (EVM). 5+5=10

   b) Explain the concept of a smart contract in blockchain technology. Provide examples of real-world applications that can leverage smart contracts. 5+5=10

5. a) Explain the steps involved in the lifecycle of a smart contract, from development to execution. Discuss the programming languages commonly used for developing smart contracts. 5+5=10

b) Discuss the potential applications of blockchain in different industries, such as supply chain management, finance, real estate, healthcare, etc. 10

6. Write short notes on 4x5=20

a) Sybil attack

b) Distributed Consensus

c) Proof of Burn

d) Hard and soft fork

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