(3 Hours)   **(Total Marks: 80)**

N.B.: 1. Question No. 1 is compulsory.
2. Answer any three out of the remaining questions.
3. Assume suitable data if necessary.
4. Figures to the right indicate full marks.

Q1. Attempt the following (any 4):   **(20)**

     a. How does a blockchain transaction differ from a traditional transaction   **05**
     b. Explain Byzantine Generals Problem.   **05**
     c. Explain various steps to develop an Ethereum smart contract.   **05**
     d. Explain how to transfer Ethers using Metamask Wallet   **05**
     e. Explain the different function visibility and qualifiers   **05**

Q2. Attempt the following:

     a. Explain the working of a Smart Contract with a neat diagram?   **10**
     b. Differentiate between public, private and consortium blockchain.   **10**

Q3. Attempt the following:

     a. What are Merkle trees ? Explain the structure of a Merkle tree. What are the   **10** advantages of the Merkle tree? How does the Merkle tree ensure security in blockchain?
     b. What is a token? Explain different types of tokens. Explain utility tokens and   **10** security tokens in detail.

Q4. Attempt the following:

     a. Explain Blockchain transaction life cycle. Explain transactions in blockchain.   **10** What is a mempool? How miners pick transactions from the mempool.

     b. Explain the working of Proof-of-Burn (PoB), Proof-of-Stake (Pos), Proof-of-   **10** Elapsed Time (POET) algorithms. Enlist their advantages and Disadvantages.

Q5. Attempt the following:

     a. Explain in short string data type, types of arrays, and Struct data type in Solidity.   **10** Explain each with an example.
     b. Explain working of Hyperledger fabric. How to create a Hyperledger network.   **10**

Q6. Write short notes on (any 2):

     a. Compare Bitcoin and Ethereum.   **10**
     b. Explain the concept of patient-controlled health data access through blockchain.   **10**
     c. How can blockchain improve the claims processing and verification process in the insurance industry?   **10**
     d. Explain PAXOS and RAFT consensus algorithms.   **10**

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