Bharatiya Vidya Bhavan's
SARDAR PATEL INSTITUTE OF TECHNOLOGY
(Autonomous Institute Affiliated to University of Mumbai)
Munshi Nagar, Andheri (W), Mumbai – 400 058.

ESE – January 2024 (Makeup)	
Course Code: OEIT1	
Name of the Course: Blockchain Technology and Applications	
Max. Marks: 100	**Duration: 100 Minutes**
Branch: All BE-VII	

Instructions:
1) All questions are compulsory.
2) Draw neat diagrams.
3) Assume suitable data if necessary but justify the same.

Q. No.	Question	Max. Marks	COs	BL
Q. 1 (a)	Describe the fundamental concepts of blockchain technology. Provide examples of how blockchain ensures immutability and transparency in a decentralized network.	10	CO1	4
Q. 1 (b)	Compare and contrast Bitcoin and Ethereum in terms of their underlying technology, consensus mechanisms, and use cases. Highlight the key differences between the two cryptocurrencies.	10	CO1	4
Q. 2 (a)	Elaborate on the role of smart contracts in the Ethereum ecosystem. Discuss how smart contracts enable self-executing code and automate complex processes. Provide a real-world example of a smart contract application. **OR** Describe the step-by-step process of developing and deploying a smart contract on the Ethereum test network. Include key considerations such as gas fees, testing strategies, and security best practices.	10	CO2	4
Q. 2 (b)	Define the components and architecture of a decentralized application (DApp). Describe how DApps differ from traditional centralized applications and the advantages of running on a peer-to-peer network.	10	CO3	4
Q.3 (a)	Develop a basic decentralized application that interacts with the Ethereum blockchain. Include features such as user authentication and data storage on the decentralized network. Provide the relevant code snippets.	10	CO3	4
Q.3 (b)	Evaluate the use cases for blockchain technology and cryptocurrency in various industries such as finance, healthcare, supply chain, and governance. Highlight the benefits and challenges associated with implementing blockchain solutions in these	10	CO1 ,4	3

	domains.			
Q.4 (a)	Compare the consensus mechanisms used in different blockchain networks. Analyze how these mechanisms contribute to the security and scalability of the blockchain.	10	CO3 ,4	3
Q.4 (b)	Apply error handling and exception mechanisms in a smart contract. Provide examples of how these mechanisms contribute to the robustness and reliability of smart contract applications.	10	CO2	3
Q.5(a)	Implement a Hyperledger Fabric smart contract. Discuss the key differences between Hyperledger Fabric and Ethereum smart contract development	10	CO2	4
Q.5(b)	Examine the potential security risks associated with a counter smart contract and conduct a detailed analysis of how testing can help identify and mitigate these risks. Discuss specific testing techniques that are effective in addressing vulnerabilities in counter smart contracts.	10	CO2 ,3	3