School: ……Campus: ……

Academic Year: …… Subject Name: …… Subject Code: ……

Semester: …… Program: …… Branch: …… Specialization: ……

Date: ……

Applied and Action Learning

(Learning by Doing and Discovery)

Name of the Experiment: Chains Beyond Ethereum – Platform Comparisons

Objective/Aim:

- To study and compare different blockchain platforms beyond Ethereum, focusing on their architecture, consensus mechanisms, smart contract capabilities, and scalability features.
- To explore various blockchain networks apart from Ethereum.
- To analyze their technical differences, advantages, and limitations.
- To understand their use cases and applicability in decentralized applications (DApps).
- To compare consensus algorithms, transaction speeds, and development environments.

Apparatus/Software Used:

- Web Browser: For accessing blockchain documentation and data.
- Blockchain Explorers: (e.g., Solscan, SnowTrace) to view public blockchain information.
- Crypto Wallets (optional): MetaMask, Phantom, or Keplr to understand blockchain interaction.
- Stable Internet Connection: To research and view online resources.

Theory/Concept:

- Ethereum is a Layer 1 blockchain that introduced the concept of smart contracts — self-executing programs that run on a decentralized network. It allowed developers to create decentralized applications (dApps), marking a major shift from simple digital currencies like Bitcoin to programmable blockchains.
- However, Ethereum faces challenges such as high gas fees, limited scalability, and network congestion. To overcome these issues, several Layer 1 alternatives beyond Ethereum—such as Solana, Avalanche, Cardano, Polkadot, and NEAR—have emerged.
- These new platforms aim to provide faster transactions, lower costs, and better scalability while maintaining security and decentralization.
- Each of these blockchains introduces unique architectures and consensus mechanisms to improve upon Ethereum's limitations and expand blockchain usability across various industries.

**** As applicable according to the experiment.***

Two sheets per experiment (10-20)

Observation table:

Blockchain	Consensus Mechanism	Transaction Speed (TPS)	Key Features	Primary Use Case
Bitcoin (BTC)	Proof of Work	~7	Most secure and decentralized	Digital currency and store of value
BNB Chain (BNB)	Proof of Staked Authority	~160	EVM compatible, low fees	DeFi, gaming, token trading
Solana (SOL)	Proof of History + PoS	~65,000	High throughput, low latency	NFTs, DeFi, fast dApps
Avalanche (AVAX)	Avalanche Consensus (PoS)	~4,500	Custom subnets, flexibility	Financial dApps, enterprise apps
Cardano (ADA)	Ouroboros Proof of Stake	~250	Research-based, energy-efficient	Identity, governance, education
Polkadot (DOT)	Nominated Proof of Stake	~1,000	Parachains, cross-chain support	Interoperability between blockchains
Cosmos (ATOM)	Tendermint Proof of Stake	~1,000	IBC protocol for app chains	Cross-chain communication
NEAR Protocol (NEAR)	Sharded Proof of Stake	~100,000 (theoretical)	Human-readable accounts, scalable	Web3 applications, user-friendly dApps
Algorand (ALGO)	Pure Proof of Stake	~1,000	Fast finality, low energy	Payments, finance, sustainability
Tezos (XTZ)	Liquid Proof of Stake	~40	Self-amending governance model	NFTs, art, on-chain voting

*Conclusion:

- This theoretical study shows that Layer 1 blockchains beyond Ethereum have expanded the blockchain ecosystem by addressing Ethereum's limitations.
- Solana and NEAR prioritize speed and performance.
- Cardano and Algorand focus on research and energy efficiency.
- Polkadot and Cosmos advance cross-chain interoperability.
- BNB Chain and Avalanche provide flexible, developer-friendly environments.
- Together, these networks contribute to the evolution of a multi-chain blockchain world that is more scalable, accessible, and environmentally sustainable.

ASSESSMENT

Rubrics	Full Mark	Marks Obtained	Remarks
Concept	10		
Planning and Execution/Practical Simulation/ Programming	10		
Result and Interpretation	10		
Record of Applied and Action Learning	10		
Viva	10		
Total	**50**		

Signature of the Student :

Name :

Signature of the Faculty :

Regn. No. :

**** As applicable according to the experiment.***
Two sheets per experiment (10-20) to be used