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 Experiement : D

Objective/Aim:

- To study the **Ethereum architecture** and its working principles.
- To understand the concept of **Ethereum Clients** and their role in the blockchain network.
- To learn about the **Ethereum Virtual Machine (EVM)** and how it executes smart contracts.
- To explore how **different clients** maintain network consensus and synchronization.

Apparatus/Software Used:

- **Programming Language**: Solidity
- **Blockchain Explorer**: Remix IDE
- **Ethereum Client**: Geth / Hardhat

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Theory concept:

Ethereum: A decentralized blockchain platform supporting smart contracts and decentralized applications (dApps).

Ethereum Clients: Software implementations of the Ethereum protocol (e.g., Geth, Nethermind, Besu). They allow nodes to join the Ethereum network, sync data, and interact with the blockchain.

Ethereum Virtual Machine (EVM): A decentralized computation engine that executes smart contracts. It uses bytecode, gas, and opcodes to ensure deterministic execution of contracts across all nodes.

Accounts:

- Externally Owned Accounts (EOA): Controlled by private keys.
- Contract Accounts: Controlled by smart contract code.

Gas: The unit that measures the amount of computational effort required to execute operations on the EVM.

Procedure:

- **Install and set up an Ethereum client (e.g., Geth or Besu).**
- **Connect the client to the Ethereum test network**
- **Create an account and obtain test Ether.**
- **Write and deploy a simple smart contract using Solidity.**
- **Observe how the EVM executes the contract and records results on the blockchain.**
- **Note the gas usage, transaction details, and output.**

Observation:

- The Ethereum **client successfully connects** to the blockchain network and synchronizes data.
- The **EVM executes smart contracts** correctly and records transactions on the ledger.
- Each operation consumes a certain **amount of gas**, showing how computation cost is measured.

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.